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Educ 8805.3 Bd. Oct. 1892.

Harvard College Library

FROM

The Association.

26 July, 1892.

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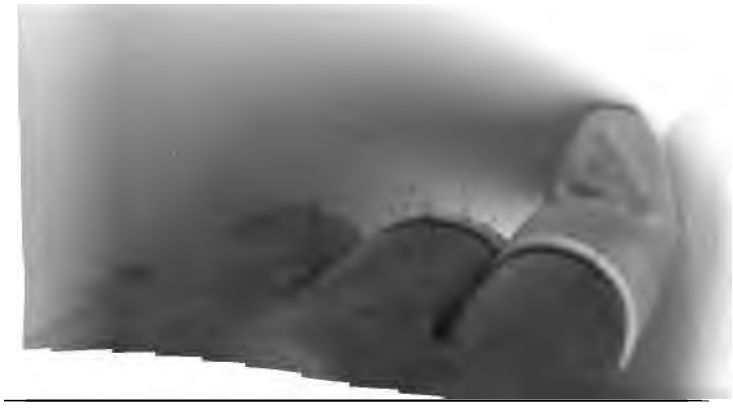

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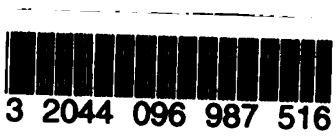
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AMERICAN ASSOCIATION TO PROMOTE THE TEACHING OF SPEECH TO THE DEAF.

VI 7052

REPORT OF THE PROCEEDINGS

OF THE

FIRST SUMMER MEETING,

HELD AT

LAKE GEORGE, N. Y.,

FROM THE FIRST TO THE TENTH OF JULY, 1891.

ROCHESTER, N. Y.

WESTERN NEW YORK INSTITUTION FOR DEAF-MUTES.

1892.

THE FIRST SUMMER MEETING, JULY 1, 1891.

AMERICAN ASSOCIATION TO PROMOTE THE TEACHING OF SPEECH TO THE DEAF.

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Educ P 345.1

HARVARD COLLEGE
JUL 26 1892
LIBRARY.

OFFICERS OF THE ASSOCIATION, 1891.

PRESIDENT,

ALEXANDER GRAHAM BELL.

VICE-PRESIDENTS,

HON. GARDINER G. HUBBARD, CAROLINE A. YALE.

SECRETARY,

Z. F. WESTERVELT.

TREASURER,

CHARLES JAMES BELL.

DIRECTORS,

DAVID GREENBERGER, *MARY H. TRUE, CAROLINE A. YALE,

Terms Expire 1892.

ELLEN L. BARTON, PHILIP G. GILLETT, Z. F. WESTERVELT,

Terms Expire 1893.

ALEXANDER GRAHAM BELL, A. L. E. CROUTER,
GARDINER G. HUBBARD,

Terms Expire 1894.

*L. S. Fechheimer was elected July 6th, to fill the place made vacant by the resignation of Miss Mary H. True to accept the office of Corresponding Secretary.

EXECUTIVE COMMITTEE.

ALEXANDER GRAHAM BELL, GARDINER G. HUBBARD, CAROLINE A. YALE,
A. L. E. CROUTER, DAVID GREENBERGER, Z. F. WESTERVELT.

ENTERTAINMENT COMMITTEE.

Mr. L. S. Fechheimer, Miss Alma Gillett, Mr. Edmund Lyon,
Miss Florence McDowell, Miss Carolyn H. Talcott,
Mr. E. Thompson, Miss June Yale.

COMMITTEE TO FURNISH NEWSPAPERS WITH REPORTS OF THE PROCEEDINGS.

Miss Ellen L. Barton, Mr. F. W. Booth,
Mr. W. A. Caldwell.

STENOGRAPHER.

Mr. W. M. Barrington.

SPECIAL COMMITTEE TO ADJUST HOTEL ACCOUNTS.

Mr. A. L. E. Crouter.

COMMITTEE ON NECROLOGY.

Hon. Gardiner G. Hubbard, Miss Sarah Fuller.

COMMITTEE ON INFORMATION AND SUPPLIES.

Miss Amy C. Bagley, Miss Mattie H. Bedford,
Miss Kate Williams, Mr. Abraham Fechheimer, Mr. Joseph King.

ORDER OF EXERCISES.

Wednesday, July 1st.

10 A. M.—OPENING EXERCISES.
Call to Summer Meeting.
Prayer, - - - - - - - - REV. DR. JOHN HEMPHILL.
Roll Call of Members in Attendance.
List of Members Sending Letters of Regret.
11 A. M.—Address by the President, - - DR. ALEXANDER GRAHAM BELL.
3 P. M.—Lecture—Anatomy of the Chest, - - - A. HEWSON, M. D.

8 P. M.
BUSINESS MEETING OF THE ASSOCIATION,
[*Open only to Members of the Association.*]

Thursday, July 2d.

9 A. M.—Lecture on the Lungs, Trachea, and Larynx - A. HEWSON, M. D.
10 A. M.—Lecture—The Thorax and Larynx, - - DR. A. GRAHAM BELL.

SCHOOL OF PRACTICE,—MISS YALE.

2 P. M.—Illustration of Methods of Teaching, - - - MR. PAUL BINNER.

8 P. M.,
LITERARY ENTERTAINMENT IN THE HOTEL PARLOR.

Friday, July 3d.

9 A. M.—History of the Education of the Deaf, - HON. GARDINER G. HUBBARD.
10 A. M.—Lecture—Anatomy of the Pharynx and Mouth, - A. HEWSON, M. D.

SCHOOL OF PRACTICE.

2.30 P. M.—Method of Instruction in the Philadelphia Institution, - -
- - - - - - - - - MISS FLORENCE MCDOWELL.
3 P. M.—Illustration of the Word Method, at the Horace Mann School, -
- - - - - - - - - - MISS ELLA C. JORDAN.
3.30 P. M.—Lecture—The Pharynx and Mouth in their Relation to Speech, -
- - - - - - - - - - DR. A. GRAHAM BELL.

8. P. M.,
BUSINESS MEETING OF THE ASSOCIATION.

Saturday, July 4th.

9 A. M.—Illustration and Explanation of the Uses of the Phonetic Manual, – – – – – – – – – – – – MR. EDMUND LYON.

2 P. M.
EXCURSION DOWN THE LAKE,
Under the Management of the Entertainment Committee.

EVENING.
Banquet and Speeches.

Sunday, July 5th.

3 P. M.—Address on "Charity," – – – – REV. DR. F. H. WINES.
Discussion on "The Teaching of Speech to the Deaf in Relation to Ethical and Religious Training," conducted by MISS CAROLINE A. YALE.
8 P. M.—Address by – – – – – – – – REV. DR. WINES.

Monday, July 6th.

9 A. M.—History of Articulation Teaching in America, – MISS CAROLINE A. YALE.
10 A. M.—How Helen Keller Was Taught to Speak, – MISS SARAH FULLER.
11.30 A M.—Lecture—Functions of the Epiglottis and Soft Palate, and Methods of Studying the Mechanism of Speech, – DR. A. GRAHAM BELL.

SCHOOL OF PRACTICE.

2.30 P. M.—Teaching Little Children, – – – – MISS ANNA M. BLACK.
Practical Work, – – – – – DR. A. GRAHAM BELL.

8 P. M.,
ENTERTAINMENT IN HOTEL PARLOR.

Tuesday, July 7th.

9 A. M.—Lecture—Visible Speech as Taught to the Deaf, – DR. A. GRAHAM BELL.
10 A. M.—Method of Articulation Teaching in the Clarke Institution, – – – – – – – – – – – – MISS CAROLINE A. YALE.
11.15 A. M.—Infant Schools for the Deaf, – – – – MISS SARAH FULLER.

SCHOOL OF PRACTICE.

2.30 P. M.—Kindergarten Exhibit, – – – – – MISS GAWITH.
Plan to Encourage Speech, – – – MISS ELSA L. HOBART.
3.30 P. M.—Blackboard, Aid in the Use of Spoken Language, – MISS IDA H. ADAMS.

7.30 P. M.,
CHILDREN'S ENTERTAINMENT AND SOCIAL.

Wednesday, July 8th.

9.30 A. M.—History of Oral Work in the Philadelphia Institution, – – – – – – – – – – – MR. A. L. E. CROUTER.

10 A. M.—Method of Articulation Teaching in the Clarke Institution, – – – – – – – – – – – MISS REBECCA E. SPARROW.

11.15 A. M.—Lecture—Consonants, – – – – – – DR. A. GRAHAM BELL.

2.30 P. M.—Addresses, – – DR. JOB WILLIAMS and DR. PHILIP G. GILLETT.

Illustration of the Development of Lip-reading, MISS ELLEN L. BARTON.

LECTURE UNDER AUSPICES OF ENTERTAINMENT COMMITTEE.

8 P. M.—The Geography of America, – – HON. GARDINER G. HUBBARD

BUSINESS MEETING.

9 P. M.—Discussion on Mr. Thompson's Plan for the Training of Oral Teachers

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Thursday, July 9th.

9.30 A. M.—Lecture—Vowels, Glides, and Combinations, – DR. A. GRAHAM BELL.

10.30 A. M.—Speech in a Manual Alphabet School, – MR. Z. F. WESTERVELT.

11.30 A. M.—The Whipple Phonetic Manual, – – – MISS DAISY M. WAY.

Mr. Hitz's Statistics. Discussion.

2.30 P. M.—Harmonics of the Voice, – – – – MR. PAUL BINNER

Methods used in England, – – – MR. WM. ROBERT ROE.

Reports from Schools,

Articulation as Taught in Primary Classes, MISS FLORENCE E. LEADBETTER.

EVENING,

Music and Social.

Friday, July 10th.

Address, – – – – – – – – – – DR. PHILIP G. GILLETT.

Lecture—Speech-reading, – – – – – – DR. A. GRAHAM BELL.

Financial Report of the Association, – – – – MR. Z. F. WESTERVELT.

RESOLUTIONS.

PRAYER.

(*Adjournment.*)

CROSBYSIDE FROM THE NORTH.

REPORT.

ERRATA.

On page 7, Programme for Thursday, change "The Whipple Phonetic Manual" to read "The Whipple Natural Alphabet."

On pages 66 and 198 after the titles read "by Dr. A. Graham Bell."

On page 87 after title read "by Hon. Gardiner G. Hubbard."

On page 156 change title to read "Discussion Upon the Lyon Phonetic Manual."

On page 331 change title to read "The Whipple Natural Alphabet."

NORTH.

REPORT.

PROCEEDINGS.

CROSBYSIDE HOTEL, LAKE GEORGE, N. Y.,
10 a. m. Wednesday, July 1, 1891.

The President, Dr. Alexander Graham Bell, at this hour called the members of the Association to order, announcing that the proceedings of this, the First Summer Meeting of the American Association to Promote the Teaching of Speecn to the Deaf, would now be opened. He asked the Secretary to read the call for the meeting.

THE SECRETARY: "By a notice published in the *American Annals of the Deaf* in April, by a Circular or Call issued May 27th, and by a subsequent publication of circulars and programme, the Board of Directors of this Association announced that in accordance with the provisions of the Constitution of the Association, it had made arrangements for the presentation of special courses of lectures, for a school of practice, and for discussions upon subjects relating to the teaching of speech to the deaf. The call to this meeting was included in these announcements to the effect, that, 'The presence of every member of the Association is desired at this first Summer Meeting of the American Association to Promote the Teaching of Speech to the Deaf, which will convene on Wednesday morning, July 1st, at ten o'clock, at the Crosbyside Hotel, Lake George, and continue in session until the afternoon of Friday, July 10th.' All persons who are interested, and all who are willing to become interested in teaching the deaf to speak have been cordially invited. The lectures, demonstrations and addresses which are to be presented, will be interesting and helpful to all teachers of speecn, to experts and to beginners, and to persons unfamiliar with the teaching of speech who may be present at the meeting. All who are here

have become assured of the fulfillment of the inducements and promises of the published circulars and programme;—as regards the place chosen for our meeting; the value of the lectures to be presented; and the practical nature of the work that has been laid out. The Association, convened, under these auspicious circumstances is now ready to take up its work."

The President then introduced the Rev. Dr. John Hemphill, of Philadelphia, who opened the session with prayer.

PRESIDENT BELL: "The Board of Directors are much gratified at the large attendance of members from so many schools for the deaf in the United States and Canada present at this the first Summer Meeting of the American Association to Promote the Teaching of Speech to the Deaf. I will call upon the Secretary to read the names of members enrolled, and to make any announcements."

The Secretary read a list of the members of the Association present, as follows:—

NEW ENGLAND STATES.

CONNECTICUT.

American Asylum for the Education and Instruction of the Deaf and Dumb.

Miss Adelia C. Fay,
Dr. Gilbert O. Fay,
Miss Alice S. Williams,
Dr. Job Williams.

MAINE.

*Miss Mary H. True.

Portland School for the Deaf.

Miss E. L. Barton,
Miss Amy C. Bagley,
Miss Estella M. Draper,
Miss E. A. Estabrook,
Miss Isabel L. Harris,
Miss Mary I. Simonds.
Pupils—Joseph King,
N. Woodbury.

MASSACHUSETTS.

Clarke Institution for Deaf-Mutes.

Miss Abbie T. Baker,
Miss Clara D. Eddy,
Miss Alice M. Field,
Miss Katharine Fletcher,
Miss Fannie W. Gawith,
Miss Flora H. Hickok,
Miss Mary A. Kathan,
Miss Fannie Lucas,
*Mrs. Chester C. Wheeler,
Miss Adella F. Potter,
Miss Ella Scott,
Miss Rebecca E. Sparrow,
Miss Ruth Witter,
Miss Grace L. Wright,
Miss Eleanor B. Worcester,
Miss Caroline A. Yale,
Miss June Yale.
Pupils—Homer Wheeler,
Melvin Wheeler.

*Not connected with institution.

Horace Mann School for the Deaf.

Miss Sarah Fuller,
Miss Kate F. Hobart,
Miss Elsa L. Hobart,
Miss Sarah A. Jordan,
Miss Kate D. Williams.
Pupils—R. E. Newhall,
A. H. Holden.

RHODE ISLAND.

Rhode Island School for the Deaf.

Miss Susan E. Littlefield.

VERMONT.

* Mrs. J. U. King.

MIDDLE STATES.

WASHINGTON, D C.

* Hon. Gardiner G. Hubbard,
* Mr. John Hitz,
* Dr. A. Graham Bell,
* Mr. W. M. Barrington. †

Columbia Institution for the Deaf and Dumb.

Prof. J. C. Gordon.

Kendall Green School for the Deaf

Mr. Theodore A. Kiesel.

MARYLAND.

School for the Deaf.

Miss Fannie I. Brock,
Miss Laura C. Yerkes.

DELAWARE.

† Miss Mary C. Hoopes.

NEW YORK.

* Mr. Henry J. Burchell,
* Mrs. E. A. Groesbeck,
* Mr. Edmund Lyon,
* Mrs. Arthur E. Sutherland,
* Mr. Henry J. Burchell, Jr.,
* Mr E A. Groesbeck,
* Miss Annie McMaster,
Miss Minnie S Stone. †

Albany Home School for the Instruction of the Deaf.

Miss Anna M. Black.
Pupils—Ned C. Groesbeck,
Minnie Price.

Central New York Institution for Deaf-Mutes.

Miss Prudence E. Burchard,
Miss Ella M. Holliday.

New York Institution for Improved Instruction of Deaf-Mutes.

Miss V. Reamy,
Miss E. J. Smith,
Mr. E. S. Thompson.

New York Institution for the Instruction of the Deaf and Dumb.

Prof. E. H. Currier.

---

* Not Connected with institution.
‡ Stenographer.
† Private teacher.

Western New York Institution for Deaf-Mutes.

Miss Harriet E. Hamilton,
Miss Olive E. D. Hart,
Miss Mary E. Loveless,
Miss Lucy B. McMaster,
Miss Margaret McGill,
Miss S. Franc Seeley.
Miss Carolyn H. Talcott,
Mr. Z. F. Westervelt,
Mrs. Z. F. Westervelt,
Master Eddie Westervelt,
Pupils—Daisy McChesney.

NEW JERSEY.

Miss Lizzie A. Foley.

New Jersey School for the Deaf.

Mrs. R. Keeler.

PENNSYLVANIA.

* Miss Evelyn Barr,
* A. Hewson, M. D.
* Miss Laura Reinholdt.

Pennsylvania Institution for the Deaf and Dumb.

Miss Mattie H. Bedford,
Mr. F. W. Booth,
Mr. A. L. E. Crouter,
Miss Ella S. Dawson,
Miss Mary L. Divine.
Miss Florence B. Dwier,
Miss Julia Foley,
Mr. J. D. Kirkhuff,
Miss Emma Lewis,
Miss Florence C. McDowell,
Miss Constance E. Newton,
Miss Emma L. Plympton,
Miss Mary B. Shaw,
Miss E. R. Thompson,
Miss Elizabeth R. Taylor,
Miss Emma F. West.
Pupils—Sarah Goldstein.
Rosa Laird,
Nellie Laird,
Addie Postel,

Pennsylvania Oral School for the Deaf.

Miss Mary B. C. Brown,
Miss Jeannette Christmas.

WESTERN CENTRAL STATES.

ILLINOIS.

Illinois Institution for the Education of the Deaf and Dumb.

Miss Eugenia Fitzsimmons,
Miss Alma Gillett,
Miss Jane V. Gillett,
Dr. Philip G. Gillett,
Miss Grace L. Higgins,
Miss Eliza Kent,
Miss M. A. Selby,
Miss Frances F. Waite,
Miss Helen H. Waite,
Miss Minnie M. Waite,
* Miss Luella Hunt.

McCowen Oral School for Young Deaf Children.

Miss Pearl McCowen,
Miss Mary McCowen.

OHIO.

* Mrs. L. S. Fechheimer,
* Mr. L. S. Fechheimer,
* Miss Cora Fechheimer,
* Mr. Abraham Fechheimer,
* Miss Edith Fechheimer.

* Not connected with institution.

Ohio Institution for the Education of the Deaf and Dumb.

Miss Lois E. Atwood, Miss Elizabeth Fay.

WISCONSIN.

Milwaukee Day School for the Deaf.

Miss Anna C. Allen, Miss Emma Wettstein.
Mr. Paul Binner, *Pupils*—Master Hugo Wendorf,
Miss Frances Wettstein, Stana Jankowska.

St. John's Deaf-Mute Institute.

Mr. L. W. Mihm.

WESTERN STATES.

ARKANSAS.

Arkansas Deaf-Mute Institute.

Miss S. H. Devereux.

COLORADO.

Colorado School for the Deaf and the Blind.

Miss Ada R. King.

MISSOURI.

*Miss Daisy M. Way, *Mrs. H. M. Way.

SOUTHERN STATES.

FLORIDA.

Florida Blind and Deaf Institution.

Mr. William A. Caldwell, *Pupil*—
Mrs. William A. Caldwell.

NORTH CAROLINA.

*Mr. B. F. Aycock, *Miss M. E. Ballinger,
*Mr. N. B. Broughton, *Prof. M. H. Holt.

North Carolina Institution for the Deaf and Dumb and Blind.

Mr. E. McK. Goodwin, Mrs. Laura A. Winston.

SOUTH CAROLINA.

South Carolina Institution for the Education of the Deaf and Dumb and Blind.

Miss Mary O. Sherrerd.

CANADA.

Ontario Institution for the Deaf and Dumb.

Miss Annie Mathison, Mrs. Robert Mathison.

*Not connected with institution.

ENGLAND.

Midland Institution for the Deaf and Dumb.

Mr. William Robert Roe, Mrs. William R. Roe.

NOTE.—The division of territory upon which the above classification is based is made by the Trunk Line Association, and was followed by the Secretary in securing reduced rates from the railways. The division as made by them is as follows :—

New England Passenger Committees controlling—territory east of New York State and Lake Champlain. Number present, 40.

Middle Passenger Committees controlling—territory east of Buffalo, Pittsburgh, and Parkersburgh, West Virginia, and north of the Potomac. Number present, 68.

Central Traffic Association controlling—trritory from Buffalo, Pittsburgh, and Parkersburgh, West Virginia, on the east, to Chicago and St Louis on the west. Number present, 26.

Western Passenger Association controlling—territory west of Chicago and St. Louis. Number present, 4.

Southern Passenger Association controlling—territory south of the Ohio and Potomac and east of the Mississippi river. Number present, 10.

The Secretary presented letters from members named in the following list, expressing regret at their inability to attend the meeting of the Association.

Ashcroft, J. I.—Supt. of the Mackay Institution for the Deaf, Montreal, P. Q.

Connor, Mr. W. O.—Principal Institution for the Deaf and Dumb, Cave Springs, Georgia.

Clarke, Mr. F. D.—Principal Arkansas Deaf-Mute Institution, Little Rock, Ark.

Cook, Mr. George W.—Flint, Mich.

Dobyns, Mr. J. R.—Supt. Mississippi Institution for the Deaf, Jackson, Miss.

Dewing, Miss Adelia C.—Rhode Island School for the Deaf, Providence, R. I.

Ely, Mr. Charles W.—Principal Maryland School for the Deaf, Frederick, Md.

Garrett, Miss Emma—Pennsylvania Oral School for the Deaf, Scranton, Pa.

Gillett, Dr. Philip G.—Superintendent Illinois Institution for the Deaf and Dumb, Jacksonville, Ill.

Greenberger, Mr. D.—Principal New York Institution for Improved Instruction, Lexington Avenue, New York.

Gallaudet, Dr. E. M.—President National Deaf-Mute College, Washington, D. C.

Harris, Miss Emma P.—Institution for the Deaf, Malone, N. Y.

Jenkins, Mr. W. G.—American Asylum, Hartford, Conn.

Jenkins, Mr. Weston, Supt. New Jersey School for the Deaf, Trenton, N. J.

McCowen, Miss Mary—Principal Voice and Hearing School for the Deaf, Englewood, Ill.

Mathison, Mr. Robert—Superintendent Ontario Institution for the Deaf and Dumb, Belleville, Ont.

Maloney, Mr. J. A.—Washington, D. C.

Osborn, Miss Virginia A.—Prin. Cincinnati Oral School for the Deaf, Cincinnati, O.

Peet, Dr. Isaac L.—Principal New York Institution for the Deaf and Dumb, Washington Heights, N. Y.

Porter, Prof. Samuel—Farmington, Conn.

Ray, Mr. John E.—Superintendent Colorado School for the Deaf and Blind, Colorado Springs, Col.

Rogers, Miss Harriet B.—North Billerica, Mass.

Swett, Miss Nellie—New England Industrial School for Deaf-Mutes, Beverly, Mass.

Schmitt, Miss Anna—1706 Fifth Street, Washington, D. C.

Sister Charles—Providence Deaf and Dumb Institution, 401 St. Denis Street, Montreal, Can.

Trepanier, Father F. X.—Deaf and Dumb Institution, Montreal, Can.

Wilkinson, Dr. Warring—Prin. Institution for the Deaf and Dumb, Berkeley, Cal.

The Secretary announced : "Typewritten programmes will be posted daily upon the door-post at the front entrance to the parlors, presenting such modifications of the published programme as it may be found advisable to make.

"The ladies of the Committee on Information and Supplies will have a stand in the hall at the front entrance of the hotel, and will furnish all members who have not received them, with copies of the several publications of the Association, which are, the Constitution and By-laws, the Circular of Information No. 1, by Mr. Greenberger, and the printed programmes for this meeting. Newspapers giving published accounts of the daily proceedings of the Association can be procured from this Committee, who will also be supplied with whatever members may need in the way of stationery, etc.

"There will be a meeting of the Board of Directors at the close of this afternoon's session, at which action will be taken upon such applications and recommendations for membership as the Secretary may have to lay before them.

"If any of the members present have failed to receive certificates of membership, or the publications of the Association, the Secretary will be obliged if they will see that he has their correct address.

"The Secretary is requested by the Board of Directors to invite all persons who have come to Lake George in company with friends who are members of the Association, and all guests of the hotel, to attend the lectures. We should be glad if such an interest could be awakened as that they should desire to unite with us. Our Entertainment Committee is a most competent and efficient auxiliary to the work of the Association. It is arranging for our evening entertainments, and for other pleasures in which all may take part; but it is desired that every member of the Association should regard himself as a special committee of entertainment to see that the invitation extended by the Directors is urged upon all friends present with us, severally and repeatedly, to be present at the public meetings of the Association. Every member, it is hoped, will do whatever he can to make this Summer Meeting a social success."

THE PRESIDENT : "Allow me to second the invitation of the Secretary and say to those persons present who may not be members of the Association that we welcome you very cordially to our meeting. We trust that you may become so much interested in our work that you may desire to join our Association, and help us

to promote the teaching of speech to the deaf. To many of you, no doubt, it may be a matter of surprise that deaf children should need to be taught to speak. You have heard of "deaf-mutes" and have probably imagined that the affliction in their case is of a very different kind from that of persons who are simply "deaf." A little reflection, however, will convince you of your error. We are all born "dumb" or "mute," and we learn to talk by hearing others speak. But if a child with perfect vocal organs should happen to be born deaf, how can he "hear others speak?" He necessarily remains dumb until specially instructed in the use of his vocal organs. The special methods of instruction employed in America have been successful in giving the power of speech to many of these little afflicted ones, and we aim to promote the teaching of speech by bringing together, in meetings like this, the teachers of articulation who are employed in the work.

"We have provided lectures upon the mechanism of speech and the anatomy of the vocal organs; and have arranged for the practical exemplification of school-room work by experienced teachers. We hope, by friendly discussion, and a comparison of experiences, to bring about a gradual improvement in the methods of instruction employed, so that better articulation may be taught, and a larger number of pupils be reached.

"Before proceeding with the regular work of the meeting, a few words concerning the origin of the Association may not be out of place.

"Many of the members present can recall the time when no articulation teachers were employed in this country, and when all our deaf children were allowed to grow up as "deaf-and-dumb." In the year 1867, three oral schools sprang into existence, and since that time articulation teaching has assumed importance in the United States. The number of teachers engaged in the work has constantly increased until now articulation teachers constitute 45 per cent. of the hearing teachers employed in our schools. The number of pupils has also increased. Previously to 1867, few, if any, were taught to speak; but last year we had under instruction in articulation no less than 3,682 deaf children in American schools. But 5,219 others, constituting 58.6 per cent., or the majority of the whole, received no instruction whatever in the use of their vocal organs. These were not cases of pupils who had been placed for trial in articulation classes and had failed. Many of them, doubtless, could have been taught to speak; but from various causes, such as

lack of trained teachers, lack of funds, etc., they had never had a chance to learn. This large percentage of "dumb" in our schools for the deaf, is the cause of the existence of this Association. Our special work is the reduction of that percentage.

"Before the year 1874, articulation teachers constituted only a small minority of the instructors of the deaf, and they possessed no organization of their own to advance their work. In that year organization was for the first time effected. On the twenty-fourth of January, 1874, those teachers who employed my father's system of Visible Speech in the instruction of their pupils met in convention in Worcester, Mass.* At this meeting the benefits to be derived from a discussion of technical details by specialists engaged in articulation work, became so obvious that a committee was appointed to call another convention to meet the same year, and to invite the attendance of all teachers of articulation and of all persons interested in the work. This Second Convention of Articulation Teachers met in Worcester, Mass., on the thirteenth day of June, 1874.† Oral teachers, of course, enjoyed all the privileges and benefits of the Quadrennial Convention of the Instructors of the Deaf held in America; so that separate meetings were not imperatively necessary. Still the results of the Second Convention of Articulation Teachers showed that a very great advantage would be derived from occasional meetings of this kind; and a committee was appointed to call another convention whenever in their opinion the interests of articulation teaching would be advanced thereby.

"At the suggestion of Mr. Greenberger this committee decided to call another convention in the year 1884, and this Third Convention of Articulation Teachers met in New York, June 25, 26, 27, 28, 1884, at the New York Institution for the Improved Instruction of Deaf-Mutes.‡ The results of this meeting again proved the very great importance of special meetings of articulation teachers. But the opinion was expressed that the interests of articulation teaching might be better advanced by the organization of a special section of the Quadrennial Convention to be devoted to articulation work, rather than by holding independent conventions for the purpose. A resolution was unanimously adopted requesting the Eleventh Quad-

* For proceedings see *Annals*, April, 1874, Vol. 19, p. 90

† For Proceedings see *Annals*, October, 1874, Vol. 19, p. 217.

‡ The proceedings were published by the *Voice* magazine, Albany, and copies may be obtained by addressing the Volta Bureau, Washington, D. C.

rennial Convention of Instructors of the Deaf, which was to meet in California in 1886, to form an articulation section to be devoted to the discussion of details of articulation work by the oral teachers of the convention.

"A committee was also appointed with full powers to call another separate convention should they deem such a course necessary or advisable.

"The Eleventh Quadrennial Convention of the Instructors of the Deaf met in Berkeley, California, on the fifteenth day of July, 1886;* but no formal action was taken upon the resolution requesting the formation of an articulation section. The convention, however, recognizing the great progress that had been made in the art of teaching speech to the deaf, and the injustice of designating as "deaf and dumb" persons who could speak, dropped the title "dumb" from the name of the convention, and from the name of the *Annals*,—the official organ of communication among teachers of the deaf. "*The American Annals of the Deaf and Dumb*" became "*The American Annals of the Deaf*" and the "Quadrennial Convention of American Instructors of the Deaf and Dumb" became a convention of "Instructors of the Deaf." A Normal Department of the convention was established in which articulation work received considerable attention. The convention also passed unanimously the following resolutions which have had an important bearing upon the organization of this body:—

WHEREAS, 'The experience of many years in the instruction of the deaf has plainly shown that among the members of this class of persons, great differences exist in mental and physical conditions and in capacity for improvement, making results easily possible in certain cases which are practically and sometimes actually unattainable in others; these differences suggesting widely different treatment with different individuals; it is therefore

Resolved, 'That the system of instruction existing at present in America, commends itself to the world, for the reason that its tendency is to include all known methods and expedients which have been found to be of value in the education of the deaf, while it allows diversity and independence of action, and works at the same time harmoniously, aiming at the attainment of an object common to all.

Resolved, 'That earnest and persistent endeavors should be made in every school for the deaf to teach every pupil to speak and read from the lips, and that such efforts should be abandoned only when it is plainly evident that the measure of success attained does not justify the necessary amount of labor.

Provided, 'That these children who are given to articulation teachers for trial, should be given to articulation teachers who are trained for the work, and not to novices, before saying it is a failure; and

Provided, 'That a general test be made and that those who are found to have sufficient hearing to distinguish sounds, shall be taught aurally.

* The proceedings have been published by the California Institution for the Deaf and Dumb, Berkeley, California.

"In view of the fact that the California Convention had unanimously passed the above resolutions with provisos the committee appointed by the Third Convention of Articulation Teachers did not deem it necessary to convene a special meeting of oral instructors between the years 1886 and 1890.

"On the twenty-third day of August, 1890, the Twelfth Quadrennial Convention of American Instructors of the Deaf met in New York at the New York Institution for the Deaf and Dumb at Washington Heights.* At that convention statistics were presented, showing how far the resolution of the California Convention which I have just read had been carried into effect.

TABLE I.

STATISTICS COMPILED FROM THE AMERICAN ANNALS OF THE DEAF.

DATE.	INSTRUCTORS OF THE DEAF EMPLOYED IN AMERICAN SCHOOLS.			HEARING TEACHERS.		PERCENTAGE OF HEARING TEACHERS.	
	Total Teachers.....	Deaf Teachers.....	Hearing Teachers.....	Articulation Teachers.....	Not Articulation Teachers.....	Articulation Teachers.....	Not Articulation Teachers.....
1884	508	155	353	—	—	—	—
1885	540	150	384	—	—	—	—
1886	566	158	408	134	274	32.8	67.2
1887	577	155	422	171	251	40.5	59.5
1888	606	154	452	199	253	44.0	56.0
1889	615	160	455	208	247	45.7	54.3
1890	641	170	471	213	258	45.2	54.8
1891†	686	167	519	260	259	50.0	50.0

"These statistics show that in spite of the California resolution, and after four years of work, there were 5,219 deaf children in our schools who received no instruction in the use of their vocal organs: and that these constituted the majority of the pupils. The oral teachers of the convention met together for the purpose of deliberating upon this result, and of discussing plans for the advancement of articulation teaching.

* The proceedings have been published by the New York Institution.

† The Table has been extended up to date,—January 1, 1892, so as to include the statistics for 1891.

TABLE II.

STATISTICS COMPILED FROM THE AMERICAN ANNALS OF THE DEAF.

DATE.	NUMBER OF PUPILS IN AMERICAN SCHOOLS FOR THE DEAF.			PERCENTAGE OF PUPILS IN AMERICAN SCHOOLS FOR THE DEAF.	
	Total Pupils.	Taught to Speak.	Not Taught to Speak.	Taught to Speak.	Not Taught to Speak.
1884	7,482	2,041	5,444	27.2	72.7
1885	7,801	2,018	5,183	33.5	66.4
1886	8,050	2,484	5,566	30.8	69.1
1887	7,978	2,550	5,422	32.0	67.9
1888	8,372	3,251	5,121	38·8	61.1
1889	8,575	3,412	5,163	39.7	60.2
1890	8,901	3,682	5,219	41.3	58.6
1891*	9,232	4,245	4,987	46.0	54.0

"The attention of the Quadrennial Convention was called to the fact that no formal action had been taken upon the resolution addressed to that body by the Third Convention of Articulation Teachers requesting the organization of an articulation section, and it was suggested that some action should be taken at the present meeting. The matter was referred to the business committee which reported favorably to the main body. As a result the following resolution was unanimously adopted :—

'WHEREAS, At the last Convention of Articulation Teachers of the Deaf and Dumb a resolution was adopted looking to the formation of a section of the American Instructors of the Deaf, for the promotion of articulation teaching; therefore, be it

Resolved, 'That the oral teachers of this convention be invited to form a section for the purpose indicated, to be organized under its own officers; the hours of meeting to be determined by the appropriate committee of the convention, and to be so ordered as to harmonize with the general meetings and with the normal section'

"In response to this invitation, the oral teachers of the convention met and organized an articulation section upon the model of the general convention. The management was vested in an executive committee of five members consisting of the following persons : Miss Caroline A. Yale, Miss Sarah Fuller, Miss Ellen L. Barton, Mr. David Greenberger, and Mr. A. L. E. Crouter.

"The oral teachers of the convention recognizing the fact that we possessed in America no chartered body of a national character capable of receiving donations and bequests for the benefit of the deaf, resolved to effect a permanent organization of this character, to be devoted to the promotion of articulation teaching.

* The table has been extended up to date,—January 1, 1892, so as to include the statistics for 1891.

"A preliminary organization was effected on the 27th of August, 1890, by the election of Miss Yale as Chairman and Mr. E. S. Thompson as Secretary. I will read the minutes because it was this meeting that gave birth to our association; and the members who were present upon that occasion are the original promoters of this society and will hereafter forever be distinguished as The Original Promoters of the Association. The following are the minutes :—

August 27, 1890.

'Miss YALE in the Chair.

'At a meeting held this morning Dr. Bell proposed a plan for a National Association for the Promotion of Teaching Speech to the Deaf. In case it should become a chartered body he would give $25,000 to the Society. Mr. Greenberger urged the necessity of annual meetings of articulation teachers, and suggested the idea of a summer school.

'Moved and passed that persons whose names are on the list taken by the Secretary be considered members of the Association.

'The list is as follows :

ASHCROFT, J. I., Mr.,
BARTON, ELLEN L., Miss,
BELL, DR. ALEXANDER GRAHAM,
BLISS, SUSAN E., Miss,
BUTLER, EVELYN A., Miss,
CROUTER, A. L. E., Mr.,
DAWSON, ELLA S., Miss,
DWYER, M. DOSITHEUS, Sister,
FISH, KATE H., Miss,
FRANKLIN, MARY, Miss,
GAWITH, F. M., Miss,
GILLETT, ALMA, Miss,
GREENBERGER, DAVID, Mr.,
GRIMM, AGNES M., Miss,
HAMILTON, HARRIET E., Miss,
HOBART, ELMIRA S., Miss,
JACK, IDA M., Miss,
KENT, ELIZA, Miss,
LEWIS, EMMA, Miss,
MCDOWELL, FLORENCE C., Miss,
MATHISON, ANNA, Miss,
METCALF, MATTIE F., Miss,
NEWTON, CONSTANCE S., Miss,
RICHARDS, LAURA DEL., Miss,
SHAW, MARY B., Miss,
TAYLOR, VIOLA, Miss,
TERRELL, PARK, Mrs.,
THOMPSON, E. S., Mr.,
WEST, EMMA F., Miss,
YALE, CAROLINE A., Miss.
YOST, STELLA, Miss.
ASHCROFT, HARRIET G., Mrs.,
BEDFORD, MATTIE H., Miss,
BLACK, ANNA M., Miss,
BURKE, MARY A. SISTER,
CHRISTMAS, JEANNETTE, Miss,
CURRIER, E. H., Prof.,
DEVEREUX, S. H., Miss,
FAY, ELIZABETH, Miss,
FLAHERTY, MARY, Miss,
FRENCH, A., Miss,
GEORGE, ADELE, Sister,
GLADDING, FANNIE D., Miss,
GRIFFITH, MAUDE I., Miss,
GROSBECK, E. A., Mr.,
HITZ, JOHN, Mr.,
HOOPES, MARY C., Miss,
KEELER, SARAH WARREN, Miss,
LARKINS, ANNA M., Miss,
LOUNSBURY, C. E., Mrs.,
MCGUIRE, MARY, Miss,
MEIGS, JANE, Miss,
MORGAN, MARY B., Miss,
PARTELL, MARY J., Miss,
ROGERS, H. B., Miss,
STRYKER, ELIZABETH M., Mrs.,
TERRELL, PARK, Mr.,
THOMPSON, EMMA ROSS, Miss,
TRUE, MARY H., Miss,
WESTERVELT, Z. F., Mr.,
YERKES, LAURA C., Miss,
ZORBAUGH, GRACE, Miss.

'The foregoing minute was approved.

'Mr. Terrell moved that a committee be appointed by the chair to nominate trustees.

'Passed.

'The Chair appointed Mr. Terrell, Miss Hamilton, and Miss Taylor. The Committee reported the following names :— A. Graham Bell, Caroline A. Yale, Z. F. Westervelt, Ellen L. Barton, D. Greenberger, Mary H. True.

'The report was adopted.

'Mr. Ashcroft moved that the Board of Trustees be empowered to appoint three additional members who may or may not be engaged in teaching the deaf.

'Passed.

'Miss Black moved that the Board of Trustees be empowered to take all necessary steps to give the Association permanent character, prepare its constitution and by-laws, and attend to the filing of the articles of incorporation of the Association and arrange for its meetings.

'Passed.

'Dr. Bell moved that Mr. Westervelt be delegated to report the action of the Association to the Convention of American Instructors of the Deaf.

'Passed.

'Adjourned.

E. S. Thompson, Secretary.'

"The trustees appointed held a meeting in Albany, New York, on the fourteenth day of September, 1890. A constitution and by-laws were prepared, and "The American Association to Promote the Teaching of Speech to the Deaf" was incorporated under the laws of the State of New York on the sixteenth day of September, 1890. The trustees became the Board of Directors of the new Association. It was decided to hold two meetings every year; a meeting of the whole association to be held in the summer time, at such places in America as might be decided upon by the Board of Directors; and a meeting of the Directors to be held in the winter time. This is the first Summer Meeting of the Association; but it will not be the last. The large number of delegates present shows the very great interest that is taken in our work, and I trust that as a result of this meeting, we shall find within the next year a great increase in the number of

deaf children who are taught to speak, and in the number of articulation teachers who are employed in our schools. (See Statistics for 1891 in Tables I. and II.)

"There has been for a good many years past an unfortunate antagonism between the advocates of the "oral method" of instruction and the advocates of the "combined" or "sign method." This Association does not propose to take any part in that controversy. There is a great difference between teaching speech and teaching *by* speech. The California resolution shows that all the teachers of the deaf in America and all the schools for the deaf, whatever may be their methods of instruction, are unanimous in the desire to teach speech to all of the deaf who can be successfully instructed. The California resolution defines a neutral ground upon which all teachers of the deaf may meet as friends. Upon this neutral ground we stand, and we invite into our organization sign teachers and oral teachers, and all who believe that every deaf child should be given the opportunity to learn to speak if he can, and who desire to help in bringing this about.

"I cannot, I think, do better than conclude this address by quoting the objects of the Association as defined in our charter.

'The objects for which the Association is formed are as follows :—

'To aid schools for the deaf in their efforts to teach speech and speech-reading by providing schools for the training of articulation teachers, by the employment of an agent or agents who shall, by the collection and publication of statistics and papers relating to the subject, disseminate information concerning methods of teaching speech and speech-reading, and by using all such other means as may be deemed expedient to the end that no deaf child in America shall be allowed to grow up dumb or mute without earnest and persistent efforts having been made to teach him to speak and to read the lips."

ON THE ROAD TO CROSBYSIDE—LAKE GEORGE.

ANATOMY OF THE CHEST.

WEDNESDAY, JULY 1ST.—3 P. M.

MR. A. L. E. CROUTER: We have with us this afternoon Dr. Hewson, Demonstrator of Anatomy and Instructor of Surgery to the Jefferson Medical College, and Surgeon to the Out-Patient Department of the Episcopal Hospital of Philadelphia. Dr. Hewson comes of a long line of teachers and instructors. He himself has been engaged in the work for the past twelve years, and he comes prepared to deliver a series of lectures upon the organs especially connected with speech. The Board is very happy to present to the Association so distinguished a lecturer as Dr. Hewson, and I am sure that every member present will derive much benefit from the information that he will be able to place before us.

DR. HEWSON: To give you an outline of what I have to say, it will consist simply in describing those parts of the body which are connected with the production of sound. That I may divide this subject into the three lectures which I will have the honor to deliver here, I will to-day take up those parts which are connected with the anatomy of the chest, and give it to you as briefly as possible without technicalities. If, however, I should mention some words you do not understand, you will please make a note of them, and at the next hour it will give me great pleasure to explain the points not understood. I wish to speak to-day of the cavity of the chest. This cavity is made up of the bones which form the chest wall, these being the bone in

front, known as the breast-bone, or sternum, the bones placed laterally being the ribs, and those at the back being the vertebræ and the curving round of the ribs to the vertebræ. That you may the better understand the anatomy of this part, I have here a natural skeleton of the thorax of the human body, with the diaphragm dried in the position it assumes in deep expiration. This is the actual diaphragm in place, and you can see for yourselves the real muscle, stiffened by a coat of varnish and paint. When I speak of the natural skeleton, I mean the skeleton held together by the natural ligaments which during life held the bones together. Those of you who have been accustomed to handle bones that are usually found in the schools find the dry bones fastened together by wire or catgut, making what is known as an artificial skeleton. (Figure 1.)

Fig. 1.

From Yeo's Physiology, shows the position of the ribs and the spinal column in normal form of the thorax, i. e., that assumed in expiration.

The chest wall is made up of the breast-bone, or sternum, the ribs and costal cartilages, or gristly substance connecting the front part of the ribs with the breast-bone. These latter give greater elasticity to the chest wall. The lateral wall of the thorax is made up of the ribs, as you see. The back part is made up of the vertebræ, where the posterior part, or head of the rib, attaches or articulates with the sides of the bodies of the vertebræ. Between these ribs are placed intercostal muscles extending from the neck of the

ribs to the lateral margin of the sternum. These complete the lateral and anterior boundaries and part of the posterior boundary of the chest wall. The floor of the chest is made by the diaphragm separating it from the abdominal cavity. The top of the chest is bounded by the top of the breast-bone in front, the first dorsal vertebra behind, and the margins of the first rib laterally. You will observe that it is much smaller than the base of the thorax, making the chest cavity appear as a cone. The apex of the thorax is closed in by a mass of fascia through which pass the blood vessels and the windpipe going from the heart and to the lungs. If you look at the apex of this cavity, you will find that its greater diameter is transversely, and the antero-posterior diameter is of course the lesser. If you will look at the chest cavity in front, you will observe that seven of the ribs are connected by individual cartilages with the sternum, or breast-bone ; that three lower down are connected with the breast-bone, but not by individual cartilages, their cartilages having coalesced, but finally having joined with the breast-bone ; and that further there are two more ribs, namely, the eleventh and twelfth, that are merely tipped with cartilage and have no connection with the breast-bone. The first seven are known as the true ribs, the eighth, ninth, and tenth known as the false ribs, and the eleventh and twelfth as the floating ribs. Now these false ribs give an amount of elasticity to the chest and allow a large amount of expansion, the motion of the ribs being upon the vertebral column as a fixing point, just as you would move or raise the handle of a bucket. The whole anterior and lateral portions of the thorax move upon this column as a fixed point. You will observe, therefore, that by this motion two functions are here performed : that of inspiration and expiration. Inspiration is performed by the drawing of the air into the lungs and giving to the blood in the lungs its oxygen. The air being forced out, or expired, there is thrown out from the lung that which is brought to it from other parts of the body, namely, carbonic acid, together with watery vapors. In other words, the function performed by these motions of inspiration and expiration is to draw into the cavity of the chest and the viscera contained therein, oxygen, and to expel from the cavity of the chest that which is deleterious to the body. The angle at which the cartilage attaches the tip of the rib to the side of the sternum also increases the elasticity of the chest wall. The floor of this cavity, as I have already said, is made by the diaphragm, which consists of a tendinous or central portion, and a muscular or circumferential portion. (Figure 2.)

The central portion is arranged in three segments (1, 2, 3,) called the central, or cordiform tendon. To these we have attached muscles, or the muscular part, which is attached in front to the lower part of the sternum, the cartilages of all the false ribs and the floating

Fig. 2.

THE DIAPHRAGM. 1, 2, 3. Central or cordiform tendon. 4. Ensiform cartilage. 5. Ligamenta arcuata externa. 6. Ligamenta arcuata interna. 7. Opening for the psoas parvus muscle. 8. Right crus. 9. Fourth lumbar vertebra. 10. Left crus. 11. Aortic opening with aorta in place. 12. Oesophageal opening with œsophagus in place. 13. Opening for the vena cava. 14. Psoas magnus muscle. 15. Quadratus lumborum muscle. [From Potter's Quiz. Compend of Anatomy.]

ribs, and two arcuate ligaments (5, 6,) which come from the body of the last dorsal vertebra and are attached to the transverse portions of the same and to the tip of the last rib. It also arises by two crura (8, 10) from the bodies of the lumbar vertebra. From the attachment of the central or cordiform tendon of the diaphragm to the fibrous envelope which surrounds the heart, and through this and the great vessels of the heart, an attachment of the central tendon of the diaphragm is made to the first rib, and from thence through the cervical fascia to the under surface of the base of the skull. This cordiform, or central tendon of the diaphragm, consists of three leaflets : one placed on a level with the junction of the second and third portions of the breast-bone, and the others placed laterally. You will observe, then, that by this fixed point of attachment, namely, the base of the skull, it is impossible for this central or cordiform tendon of the diaphragm to descend (Figure 4) ; but that the lateral muscular portions may descend, but that they will not descend below a line drawn from the most central portion of the base of the thoracic cavity to the margin made by the apices of the ribs and the costal

cartilages. The position of the diaphragm, owing to the shape of the ribs and the attachment of this central tendon of the diaphragm in its fixed relation to the fascia of the thorax and the neck, makes the vertical, lateral diameter of the chest very much greater than its central, vertical diameter. Again, from the arching of the diaphragm

Fig. 4.

DIAGRAM SHOWING THE INTERVAL BETWEEN THE POSITION OF THE DIAPHRAGM IN EXPIRATION (e, e_1), AND INSPIRATION (i, i_1). The increase in capacity is shown by the white areas. [From Yeo's Physiology.]

backward to the lower part of the last rib, from the curving of the vertebral column, and also from the curvature of the ribs, the vertical posterior diameter will be very much greater than the vertical anterior diameter of the chest. (Figure 3.)

Fig. 3.

SAGITTAL SECTION THROUGH THE SECOND RIB ON THE RIGHT SIDE. When the arched muscular part of the diaphragm contracts, a wedge-shaped space, with its apex downwards, is formed around the circumference of the lower part of the chest. [From Landois and Stirling's Human Physiology.]

Now what is it that moves this chest cavity? For the present we have nothing to do with the cavity below the diaphragm ; but here we must pause a minute before we dismiss this abdominal cavity, for the walls of the abdominal cavity are such that they play an important part in the function of respiration. If the abdominal muscles are paralyzed it is very difficult to breathe. These abdominal muscles attach the lower part of the chest wall to the upper part of the pelvis. These muscles are arranged in pairs upon each side, adjoining each other, most of them in the middle line. There is a muscle on each side of the middle line running directly from the inferior portion of the breast-bone, or sternum, down to the top of the pubis. This muscle is broad and expanded above, narrows to a point, and then is perfectly straight. It is the straight muscle of the abdomen, or the rectus abdominis. (Figure 5, No. 16.)

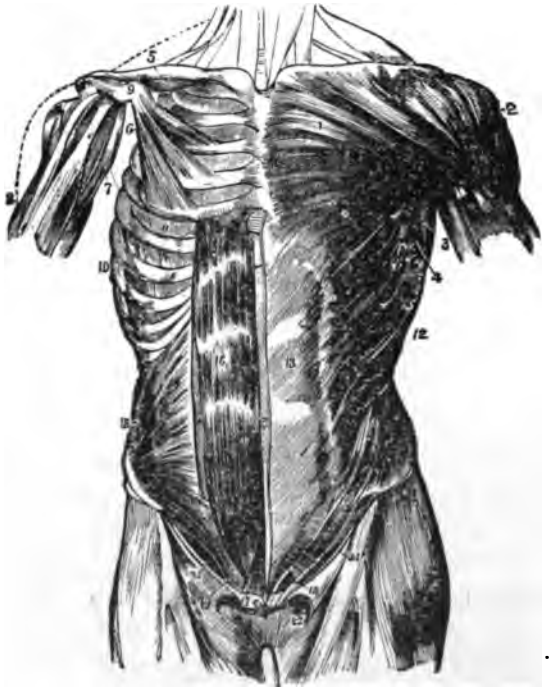


Fig. 5, A.

MUSCLES OF THE ABDOMEN. 1. Pectoralis major muscle. 2. Deltoid muscle. 3. Teres minor muscle. 4. Serratus magnus muscle. 5. Clavicle. 6. Pectoralis minor muscle. 7. Coraco-Brachialis muscle. 8. Biceps muscles. 9. Coracoid process of the scapula. 10. Infra-costales muscles. 11. External and internal intercostal muscles. 12. External oblique muscle. 13. Tendon of the external oblique muscle. 14. Poupart's ligament. 15. External abdominal ring. 16. Rectus abdominis muscle. 17. Pyramidalis abdominis muscle. 18. Internal oblique muscle. [From Potter's Quiz. Compend of Anatomy.]

Then arising from the side and lower part of the chest, and passing obliquely down to be attached to Poupart's ligament (14) and to the crest of the iliac bone, and finally passing down to the crest of the pubic bone, is a muscle which runs obliquely. This muscle is the most external of all, and is known as the external oblique (12). There is another muscle which arises from the crest of the ilium from Poupart's ligament (14) and runs obliquely upward to the lower part of the costal cartilages and sternum. This muscle is known as the internal oblique (18). There is still another muscle which runs from a piece of fascia or gristle. This latter starts at the back part from the sides of the vertebræ and the inside of the internal oblique muscle, and passes transversely around the side of the abdominal cavity, and is attached not only below to the pubis, but above in the same manner as the external and the internal oblique muscles are attached to the middle line, and to the cartilages of the sternum and ribs. This muscle runs transversely, and is called the transverse abdominal muscle, or the transversalis abdominis. Now there is another little muscle which arises from the top of the pubis and passes up to the middle line or depression between the two straight muscles in the centre, and because it is of a pyramidal shape, it is called the pyramidal muscle of the abdomen, or the pyramidalis abdominis (17). There is still another muscle situated at the back part of the abdomen, passing from the crest of the ilium and going directly upward to the last rib, and also to the transverse portions of the lumbar vertebra. This muscle is peculiarly arranged, so that it will not only pull upon the last rib, but so that it will also pull the side of the vertebral column toward the ilium, if one or other side contract ; but when both contract together, they fix the last rib. This muscle is known as the quadratus lumborum. (Figure 2, No. 15.)

There is also another muscle situated inside of the abdominal cavity, which has no function connected with the process of respiration, but which I would be derelict if I did not call your attention to. I refer to the psoas magnus muscle, which lies to the side of the vertebræ. (Figure 2, No. 14.)

These, then, are all the muscles we have any immediate contact with in the abdominal cavity depending upon respiration. Now, if any one of you were to take a deep inspiration, you would find, if it is a male, that the abdominal wall will go in, and that the chest wall will expand forward. Now if it is a female, you will find that the abdominal wall will not go in so much, but that the chest

will go out further than in the male. In ordinary respiration, as you breathe quietly, there is a small amount of motion between the abdominal cavity and the chest cavity, a gradual bending backward and forward. In other words, the character of the respiration of the individual differs in the two sexes ; the male respiration being more of the abdominal type, or inferior intercostal, and that of the female being more of the superior intercostal type. If you take a violent inspiration you will see that the abdominal respiration will be exaggerated, and that the chest goes forward and the abdomen goes in. The respiration is mostly in the inferior intercostal region. In the female the ordinary respiration is more thoracic than abdominal. Now, this chest and abdominal respiration is unfortunately interfered with by the style of dress of the present day. The ordinary stays, as worn now, interfere with the abdominal breathing in the female. Abdominal breathing in the male is, of course, not interfered with. If, however, the stays are not worn, or are abandoned, the respiration will become more abdominal. If you take a child of thirteen years, and do not put stays upon it, you will find that the respiration will more likely be abdominal than thoracic; hence in the female the respiration will be more thoracic than in the male. If the stays are persisted in, the abdominal respiration will be entirely lost, owing to the pressure on and the displacement of certain viscera.

What is it that moves the ribs? In the spaces between these ribs we have muscles constituting two layers, arranged in different ways, and, in fact, antagonistic to each other. These muscles on the outside are known as the external intercostals. (Figure 6, No. 2.) They elevate the ribs. They consist of eleven pairs of muscles arising from the lower margin of the first rib, and passing completely around from the margin of that rib in an oblique direction downward and forward to the upper margin of the rib below, and are continued to the margin of the sternum. The muscles that are inside, toward the chest wall, depress the ribs, and are known as the internal intercostals (3), arising from the upper borders of the eleven lower ribs and are attached to the lower borders of the ribs above. Now, we have other muscles on the outside of these that run across the breast and raise the upper part of the chest. Then we have a muscle which comes from the side of the chest and runs all the way from the second rib down to the eighth, and comes back to the front margin of the vertebral border of the shoulder-blade. This muscle, from its numerous serrations (for it has nine), and from its large size, is called the serratus magnus. (Figure 5. A. No. 4.)

Its action is to elevate the ribs, the shoulder-blade being fixed, and it is known as the muscle of forced inspiration. The levatores costarum arise from the transverse processes of the dorsal vertebræ behind the ribs, and are attached to the ribs at their angles upon the posterior surface. Their action is to elevate the lateral portion of the ribs. (Figure 6, No. 1.)

The triangulares sterni arises from the posterior part of the sternum on either side of the middle line, opposite the articulations of the fourth, fifth, and sixth ribs, and are attached to the cartilages of the second, third, and fourth ribs above. Their action is to pull down the costal cartilages to the side of the breast-bone. The chest cavity is lined on the inside throughout with two membranes, known as the pleura. These membranes form a covering upon the lungs and upon the inside of the chest wall. This pleural membrane

Fig. 6.

VIEW FROM BEHIND OF FOUR DORSAL VERTEBRÆ AND THREE ATTACHED RIBS, SHOWING THE ATTACHMENT OF THE ELEVATOR MUSCLES OF THE RIBS AND THE INTERCOSTAL. [From Allen Thomson.] 1. Levatores costarum muscles. 2. External intercostal muscles. 3. Internal intercostal muscles. 4. Dorsal vertebræ. 5. Ribs.

secretes a thin fluid, which enables the lung to move in the chest cavity without hindrance to itself. It acts, as it were, as the grease to the axle, enabling the function of respiration to go on unimpeded.

What is it, now, that moves the ribs? I have already spoken to you of the action of the intercostals, and of the part played by the action of the triangulares sterni, the levatores costarum and the intercostals. The action, however, of the intercostals you can observe by referring to Figure 7. The abdominal muscles will, of course, bring down the chest and the internal intercostal muscles will bring down the ribs. Now there is another muscle which comes from the spinous processes of the last two dorsal vertebræ and the first three lumbar vertebræ, and goes to the lower border of

the four lower ribs at their angles. This muscle will pull down the lower part of the chest, and is known as the serratus posticus inferior. (Figure 5, B, No. 16.) There is, then, another one above which helps to elevate the ribs. It is called the serratus posticus superior. There is still another set of muscles which I should be very derelict if I did not mention, namely, those which come from the sides of the cervical vertebræ, and go down to the tubercles on the first and second ribs. These muscles are known as the anterior,

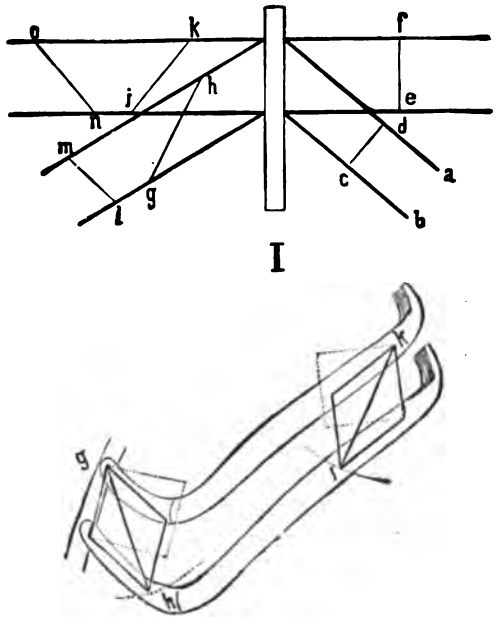


Fig. 7.

SCHEME OF THE ACTION OF THE INTERCOSTAL MUSCLES. [From Landois and Stirling's Human Physiology.] No. 1. When the rods a and b (which represent the ribs), are raised, the intercostal space must be widened, e, f, and c, d. On the opposite side of the figure, it is evident that when the rods are raised, the line g, h, is shortened (i, k, and g, h, direction of the external intercostals), l, m, is lengthened (l, m, and o, n, direction of the internal intercostals). No. 2, shows that when the ribs are raised the intercartilagenei, indicated by g, h, and t, h, the externals indicated by l, k, are shortened. When the ribs are raised, the position of the muscular fibres indicated by the diagonal of the rhomb becoming shorter.

middle. and the posterior scaleni muscles. If the neck is held in a vertical position, the first rib is so held that it will be immovable by the muscles coming from the vertebral column. Now if we take a very full inspiration, what takes place? The diaphragm is contracted in inspiration and has nothing whatever to do with expiration—absolutely nothing. There is a substance surrounding the heart which holds it in place, and passes up around the great vessels which emanate from the heart and go toward the heart. These

vessels are held to the first rib by the fibrous pericardium, which I have already alluded to, and this is in turn held to the first rib by the muscles outside, and also by the gristly prolongations up into the neck and to the base of the skull. So that if you were to get a piece of the neck of a bullock when in market, you would find that it is filled with a lot of gristle. This gristle, or fibrous substance, surrounds all the muscles, and goes directly up to the base of the skull. (Figure 4.)

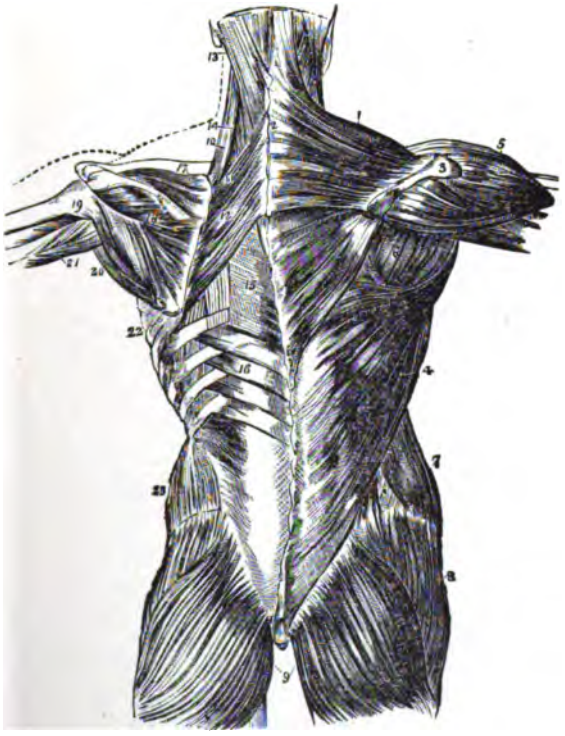


Fig. 5, B.

MUSCLES OF BACK. [From Potter's Quiz Compend of Anatomy.] 1. Trapezius muscle. 2. Tendon of the trapezius muscle. 3. Spine of the scapula. 4. Latissimus dorsi muscle. 5. Deltoid muscle. 6. Teres minor and infra spinatus muscles. 7. External oblique muscle. 8. Glutens medius muscle. 9. Glutens magimus muscle. 10. Levator anguli scapulæ muscle. 11. Rhomboideus minor muscle. 13. Rhomboideus major muscle. 13. Splenius capitis. 14. Splenius colli. 15. Fascia covering the fourth layer of muscles. 16. Serratus posticus inferior muscle. 17. Supra spinatus muscle. 18. Infra spinatus muscle. 19. Head Humerus or arm bone. 10. Terus major muscle. 21. Triceps muscle. 22. Serratus magnus muscle. 23. Internal oblique muscle.

Now then, if the diaphragm attempts to contract, there is a contraction from above downward through all these muscles of the neck to the first rib, which can only descend a small amount ; hence the central tendon of the diaphragm cannot move. If it did move it

would throw the organs of circulation out of gear. You will, therefore, see the important position the diaphragm bears to the function of respiration. Inspiration consists in the dilatation of the thorax by muscular action, and in the subsequent distension, or inflation, of the lungs by the air rushing in through the windpipe to fill up the vacuum. In inspiration the thorax, or chest cavity, is enlarged in three of its diameters. The enlargement in the vertical direction is always the greatest, especially in the young, and is due to the descent of the diaphragm during its contraction. The enlargement in the two horizontal diameters, viz., the anterio-posterior and the transverse, is most marked at the lower part of the thorax in the male, and in the upper part in the female, the difference constituting the two grand types of respiration,—the abdominal or inferior intercostal, and the superior costal, or pectoral. It is due to the elevation of the ribs and the consequent elevation and projection forward of the sternum, and also to the rotation of the ribs upward around an axis passing through their anterior and posterior extremities, somewhat after the fashion of the handle of a bucket, as already alluded to. The principal inspiratory muscle is the diaphragm. The auxiliary inspiratory muscles are the external intercostals and a small anterior portion of the internal intercostals, namely, that which is near to the sternum and between the tip of the ribs and the costal cartilages of the sternum, the anterior and posterior scaleni muscles, cervicalis ascendens, and the posterior superior serrati muscles of the back, and also the pectoralis major and minor and serratus magnus, latissimus dorsi and subclavius, when the clavicle and scapula, and consequently the humerus, or arm-bone, are fixed by the trapezius, the sterno-mastoid, levator anguli scapulæ and rhomboid. (Figures 5, A and 5, B.) Nearly all the muscles of the body may assist in violent inspiratory effort by removing from the thorax and fixing at a distance the points of origin of the foregoing muscles, thus rendering their action more efficient. The head is thrown back and the arms are firmly uplifted when gasping for breath. Expiration consists in the elastic recoil of the whole respiratory apparatus, which recoil may be aided, either to a slight or to a considerable extent, by the compression of the thorax by muscular action. The ordinary expiratory muscles are the internal intercostals, with the exception, perhaps, of the fore part, comprised between the costal cartilages, to which may be added the triangulares sterni and infra-costals. The auxiliary muscles of expiration which are called into play in involuntary expiratory efforts, as in speaking, blowing, etc., or in gasping

for breath, are all the other muscles that depress the ribs, such as the abdominal muscles, the external and internal oblique, transversales, recti, pyramidales and quadrati lumborum, the posterior inferior serratus, the muscles of the back, and when the scapulæ are fixed, the upper part of the serratus magnus. Nearly all the muscles of the body may, however, assist in violent expiratory efforts.

ORDINARY MUSCLES OF INSPIRATION.	Diaphragm, external intercostals, levatores costarum.
EXTRAORDINARY MUSCLES OF INSPIRATION.	The scaleni, cervicalis ascendens, posterior superior serrati, pectorales major and minor, serratus magnus, latissimus dorsi and subclavius.
ORDINARY MUSCLES OF EXPIRATION.	The internal intercostals, infra-costals, and triangulares sterni.
EXTRAORDINARY MUSCLES OF EXPIRATION.	External and internal oblique, transversales recti, pyramidales, quadrati lumborum, posterior inferior serrati, erector spinæ.

Now let us look at the interior of this chest cavity. The contents of the cavity are two lungs, one on each side, and the heart in the centre. The lungs correspond in shape to that which is left after you have taken out the space holding the heart, or around the heart, the pericardium, and the part occupied by the great vessels. The convexity of the lungs corresponds to the convexity of the ribs. The lungs come around in front at the upper part of the chest. The apex comes forward and upward to the apex of the chest, and goes up into the neck, protruding above the first rib about an inch and a half in front. The lung is covered with a delicate membrane, already alluded to, which enables it to move in the chest cavity. This pleural membrane, or serous membrane, is a complete sac, forming a cavity which has the property of secreting its own fluid, by which the lungs move in the thoracic cavity. When you hear a physician speak of a patient having pleurisy, it is this membrane which is affected. These two pleural cavities form two of the three serous membranes in the cavity of the thorax. The third surrounds the heart. Now from the lungs there passes out the air-tube, beginning as small air-cells. These air-cells finally take on the shape of a tube, then the tube enlarges to form another sized tube, with here and there a small portion of cartilage attached, enlarging and enlarging, until finally we have coming from each lung a bronchial tube. These bronchial tubes, the right and the left, unite to form the trachea, or windpipe, the union taking place opposite the body of

the fourth dorsal vertebra. This trachea goes upward (and is formed of a number of cartilaginous rings, which are small, semi-circular cartilages, and between these an elastic membrane), and terminates at the top in the larynx, above and posterior to which we have the pharynx, and in front of the pharynx the mouth, finally terminating in the lips. The pharynx is a musculo-membranous bag constituting a common viaduct for the transmission of solids, liquids, and the air which we breathe. But before the food passes down into the æsophagus, there is a trap door, or epiglottis, which shuts off the windpipe and prevents any of the liquid or solid substances from going down into the lungs.

WEDNESDAY EVENING, JULY 1, 1891.

FIRST BUSINESS MEETING OF THE ASSOCIATION, HELD IN ACCORDANCE WITH THE ANNOUNCEMENT IN THE PROGRAMME ISSUED JUNE 7, 1891.

Meeting called to order at 8 o'clock. President Bell in the Chair.

The Secretary read the minutes of the Meeting of the Board of Directors, which was held at the Madison Avenue Hotel, in New York City, February 16, 1891, and submitted the Constitution and By-laws adopted by the Board of Directors at that meeting, copies of which had been furnished to all members of the Association.

MR. BINNER: I move that the action taken by the Directors at the meeting held in New York City, February 16, 1891, be hereby ratified and adopted as the action of the Association.

This motion having been seconded, was carried unanimously.

THE SECRETARY: According to the announcement in the published programme issued June 7th, and according to the requirements of the Constitution, the members of the Association will elect at this first business meeting, three members of the Board of Directors, to take the places of those whose terms of office expire at the the close of this Summer Meeting. At the meeting of the Directors this afternoon, they divided themselves by lot into three classes. The Directors of the first class, whose terms of office will expire at the close of the Summer Meeting in 1891, as the lots were drawn, were, the President, Dr. Alexander Graham Bell, Hon. Gardiner G. Hubbard, and Mr. A. L. E. Crouter. Members of the second class, whose terms of office will expire at the close of the Summer Meeting in 1892, as drawn by lot, Mr. David Greenberger, Miss Mary H. True, and Miss Caroline A. Yale. The members of the third class, Miss Ellen L. Barton, Dr. Philip G. Gillett, and Mr. Z. F. Westervelt.

Mr. Binner moved that the Secretary be directed to cast a ballot for the election of Dr. Bell, Mr. Hubbard, and Mr. Crouter, to be their own successors in office.

The motion was put by the Secretary and enthusiastically adopted.

(Here followed short addresses from the President and others, which were not reported.)

MR. CURRIER: I should like to suggest that the publications of this Association be placed in the libraries of the various schools for the deaf of the country, and also in the libraries of Harvard, and Yale, and the State Library at Albany.

MR. BINNER: I would suggest that we consider a motion in favor of supplying the publications of the Association to all public libraries of the different States.

In the discussion which followed, it was urged that while it was very desirable that the publications of the Association should be in the library of every college, seminary, and normal school in the country, and in all the public libraries, it was, however, hardly feasible for the Association at this time to supply them all. It was urged upon members that they should induce librarians and trustees of library funds to become members of the Association in order that they might place our publications in the libraries in which they are interested. Mrs. King, of Thetford, Vt., stated that she would place the Circulars and the Reports of the Association, which came to her as a member, in the public library of the place in which she lives.

Upon motion it was resolved that the publications of the Association should be sent to the institutions for the education of the deaf throughout the country.

MR. WESTERVELT: The Secretary would be glad to receive at any time the names of those desiring to become members of the Association. It is hoped that the Association will include in its list of members representatives from every school for the deaf in the country. At the close of the morning or afternoon sessions he will be in readiness to attend to the issuing of certificates of membership or to the receiving of dues. It is especially requested that those who wish to unite with the Association should present in writing their names in full, their titles, and their post office addresses.

MR. CROSBY: Will you receive the names of those who have not expressed a desire to join the Association?

MR. WESTERVELT: Certainly. Any person endorsed by a member of the Association as one who will co-operate with this body in its work of promoting the teaching of speech to the deaf, without doubt, will be accepted by the Board, elected to regular membership, and notified by the Secretary. The names and addresses of such proposed members should be given in writing, with the signature of the member making the recommendation, as there may afterwards be occasion for correspondence. It is hoped that every member who proposes candidates for membership, will take such pains to inform the persons whose names he proposes, and to interest them in our work, as will prepare them to accept the honor which election to this Association confers.

THE LUNGS, TRACHEA, AND LARYNX.

THURSDAY, JULY 2D.—9 A. M.

DR. HEWSON: To-day I propose to speak of the contents of the thoracic cavity, namely, the lungs, trachea, larynx, and, if time permits, the pharynx.

THE LUNGS

consist of two light, porous, elastic bodies, which are conical in shape, their bases being in contact with the convex or thoracic surfaces of tne diaphragm, and their apexes extending above the first rib in front. They are at birth of a pinkish-white color, but in the adult state are of a mottled slate color. This mottling may become darker and darker, and in persons exposed to the vapors of carbon, they will become perfectly black. The surface of the lungs are smooth, shiny, and marked out by dark lines into polygonal-shaped, spaces locating the bases of the superficial lobules. The outer surface is convex, deepest behind, and presents on either side a deep fissure, oblique downward and forward, and from near the apex to the base and on the right side another fissure, oblique upward and forward, from the middle of the foregoing. By these fissures the left lung is divided into two lobes and the right into three The inferior lobe is the largest in both lungs, and the middle lobe of the right side the smallest of all. The inner surface is concave, deeply excavated in front, especially on the left side to make room for the heart, and presents a space a little above and behind the middle for the entrance of the bronchial tubes and the blood vessels, called the hilum. The anterior border is thin, oblique, shorter than the posterior, deeply notched inferiorly, and on the left side, so as to expose the membrane surrounding the heart, and comes in contact

with its fellow behind the middle of the sternum, the pleural lining being interposed. The posterior border is thick, rounded, vertical and longer than the anterior. The base is broad, concave, oblique downward and forward, rests upon the diaphragm, and the ribs descending lower down on the left side than on the right. (Figures 3 and 4.)

The root of the lung consists of the bronchus, pulmonary and bronchial vessels, lymphatics and glands, and pulmonary plexuses of the pneumogastric and sympathetic nerves, which parts are all enclosed in a pleural sheath, and are bound together by connective tissue. The apex passes up into the root of the neck an inch and a half or 3 c. m; 7 m. m., above the first rib, and, under cover of the scaleni muscles, comes into close contact with the first and second portions of the subclavian artery. The right lung is the shorter in consequence of the diaphragm ascending higher on the right side than on the left; the broader owing to the inclination of the heart to the left side, and somewhat the larger. The left lung is the longer, narrower, and somewhat the smaller. The glistening, shiny appearance of the surface of the lung is due to the reflection of pleura from the side of the chest on to the surface of the lung itself; this pleura surrounds the entire lung except that portion where the vessels enter at the hilum. The function performed by the pleura is to enable the lung to move in the chest cavity, and also to enable the ribs to move on the lung; in other words, it does away with any friction. Now this moving of the chest and the lungs therein contained, can be interfered with by disease or injury. If, for instance, there was a punctured wound passing through the chest cavity, this wound would let in air to the surface of the lung, and necessarily into the pleural cavity. It would, then, equalize the pressure inside and outside of the lung; but by the normal action of the parts the elevation of the ribs produces a partial vacuum in the chest cavity, and the air is drawn in, distending this cavity. Then by the elastic recoil and the muscular action of the chest cavity, the air is expelled. The vessels which carry the blood to the lungs, carry impure blood; the vessels which carry the blood from the lungs to the heart are veins, and carry arterial blood. Let us speak first of all of the commencement of this air tube which brings the air into the lung and then expels the changed air from the lung. This tube begins in a number of minute air vesicles which are arranged like a bunch of grapes, the grapes representing the air-cells, and the stems representing the commencement of that which

is afterwards the bronchial tubes. These tubes gradually enlarge and enlarge, until they appear at the hilum of the lung as a number of larger bronchial tubes, which there unite and form the right and left bronchi. The two bronchi unite opposite the upper border of the fourth dorsal vertebra, and here begins the windpipe proper, or the trachea. The right bronchus, about an inch in length, wider and more horizontal than the left one, enters the root of the lung opposite the lower border of the fourth dorsal vertebra. The left bronchus, smaller, more oblique, and nearly two inches long, enters the root of the lung opposite the fifth dorsal vertebra. The trachea begins at a point opposite the lower border of the third dorsal vertebra, and extends upward to the fifth cervical vertebra. It is firm, rounded, and supported by cartilaginous rings in front (sixteen to twenty in number), and flattened and membranous behind. The trachea, besides being composed of the cartilages already enumerated, consists of a fibrous membrane connecting the margins of these cartilages, and dividing into two layers extending over both these surfaces, the layer which covers the outer surface of the cartilage being the thickest, the muscular fibres which form a continuous pale, redish layer between the fibres and the mucous membrane in the posterior flattened portion. They are of two varieties: The external longitudinal arises from the ends of the cartilages and passes upward and downward, deep, transverse fibres connecting the extremities of the cartilages. There are elastic fibres which lie beneath the mucous membrane and are longitudinal in their direction. The mucous membrane is of a pale, rosy color, covered with an epithelium which has wavy points, or cilia, upon it. [The lecturer exhibited natural specimens of the trachea.]

RELATIONS OF THE TRACHEA.

Situated immediately behind the trachea we find the æsophagus which deviates to the left in the lower part of the neck, on either side the lateral lobes of the thyroid gland and the deep arteries of the neck, together with the pneumogastric nerve and the left recurrent laryngeal nerve. The right nerve lies somewhat behind the trachea. You will observe from the description given of the trachea that it has an amount of elasticity apart from the muscles which are joined to its upper part through the medium of the cricoid and thyroid cartilages.

THE LARYNX.

The larynx consists of nine cartilages, three single and three pairs; namely, the thyroid, the cricoid, the arytenoid, the cornicula laryngis, or the cartilages of Santorini, the cuneiform cartilages, or the cartilages of Wrisberg, and the epiglottis.

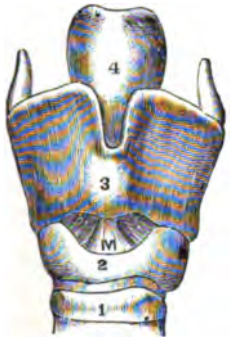


Fig. 8.

A FRONT VIEW OF THE EXTERIOR OF THE CARTILAGES OF THE FEMALE HUMAN LARYNX. 1. Upper wing of the trachea or windpipe. 2. Cricoid or wing-like cartilage, the base of the larynx. 3. Thyroid or shield-like cartilage, Pomum Adami, or Adam's apple. 4. Epiglottis. M. A membrane uniting the cricoid and thyroid cartilages, called the cricoid-thyroid membrane or ligament. [From Cohen's Throat and Voice.]

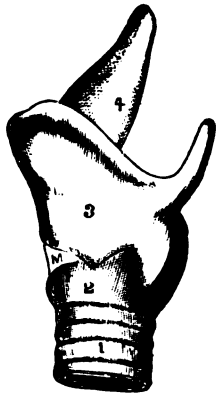


Fig. 9.

SIDE VIEW OF THE EXTERIOR OF THE CARTILAGES OF THE HUMAN LARYNX. 1. Trachea or windpipe. 2. Cricoid cartilage. 3. Thyroid cartilage. 4. Epiglottis. M. Membrane uniting the cricoid and thyroid cartilages, called the crico-thyroid membrane or ligament.

THE THYROID CARTILAGE,

The largest, (figures 8 and 9, No. 3), consists of two quadrilateral plates or alæ, joined in front at an acute angle, the highest and most prominent part of which is termed the pomum Adami, or Adam's apple. It presents for examination an outer

surface, an inner surface, upper border, lower border, and posterior border. The outer surface presents on either side the oblique line for the attachment of the sterno-thyroid (Figure 10, M, st, th.), and the thyro-hyoid muscles. (Figure 10, m, th, hyoid.) The inner surface, covered by mucous membrane externally and above, presents in the middle line the receding angle to which are attached the true and false vocal bands, the thyro-arytaenoidei and the thyro-epiglottidei muscles, the thyro-epiglottic ligament and the apex of the epiglottis. (Figures 8 and 9, No 4.)

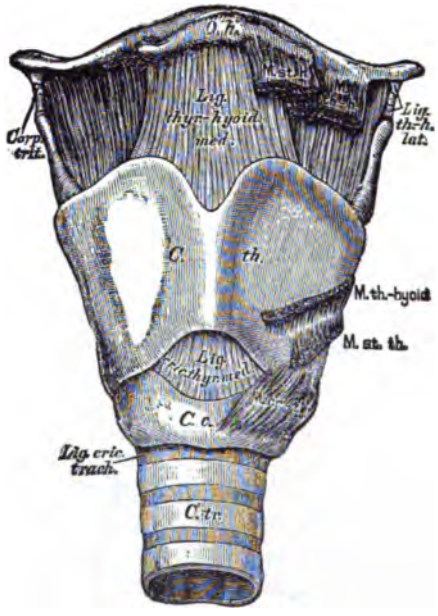


Fig. 10.

LARYNX FROM THE FRONT, WITH THE LIGAMENTS AND INSERTIONS OF THE MUSCLES. O, h, Hyoid bone ; C, th, thyroid cartilage , C, tr, tracheal cartilage,—rings of the trachea ; C, c, cricoid cartilage; Corp. trit., corpus triticum, or cartilages, sometimes found in the ligament connecting the superior cornu with the hyoid bone ; Lig. thyr, hyoid med, middle thyro-hyoid ligament; Lig. cric trach. ligament connecting the top ring of the trachea with the cricoid cartilage , Lig cric thyr. med , middle ligament connecting the cricoid with the thyroid cartilages in front; M, st, th, attachment of the sterno-thyroideus muscles; M, th, hyoid, attachment of the thyro-hyoideus muscle ; M, cr, th, attachment of the crico-thyroideus muscle , M, st, h, attachment of the sterno-hyoideus muscle. [From Landois and Stirling's Physiology]

The upper border is deeply notched opposite the pomum Adami, rounded and prominent on either side of the notch, concave laterally, gives attachment to the thyro-hyoid membrane (Figure 10). The lower border, shorter and straighter, is connected to the cartilage by the crico-thyroid membrane and muscle (Figure 10.) The posterior border is thick and rounded, gives attachment

to the stylo and palato-pharyngei, and is prolonged upward and downward respectively into the superior cornu (Figure 11, C, s,) which gives attachment to the lateral thyro-hyoid ligament. (Fig. 10, Lig. thr. h. lat.) The inferior cornu is shorter and thicker, and points downward, forward, and inward, presenting internally a small facet for the articulation with the cricoid cartilage. (Figure 11, C, i.)

THE CRICOID

(Figures 10 and 11, C, c,), is annular in shape, broader behind, narrower in front, thicker and stronger, but shallower than the foregoing cartilage. Its shape is, therefore, that of a

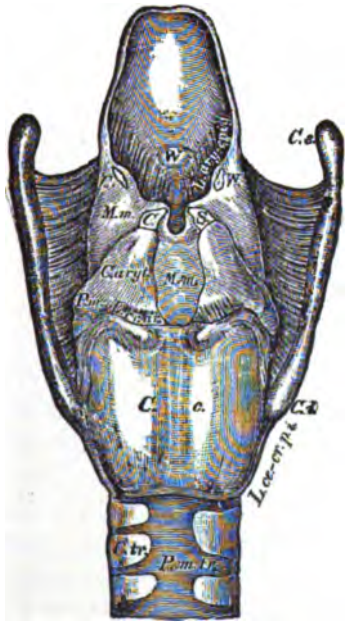


Fig. 11.

LARYNX FROM BEHIND AFTER REMOVAL OF THE MUSCLES. E, epiglottis with its cushion (w); L. ary. epig. aryteno-epiglottidean fold or ligament; M, m, mucous membrane; C, W, cartilage of Wrisberg; C, S, cartilage of Santorini; C, aryt, arytenoid cartilage; C, c, cricoid cartilage; P, m, process for attachment of muscle of the arytenoid cartilage; L, ci, ar, crico-arytenoid ligament; C, s, superior cornu of the thyroid cartilage; C, i, inferior cornu of the same; L, ce, cr, pi, posterior inferior crico-thyroid ligament; C, tr, posterior part of the tracheal rings; P, m, tr, membranous portion of the trachea containing mucous fibres. [From Landois and Stirling's Human Physiology.]

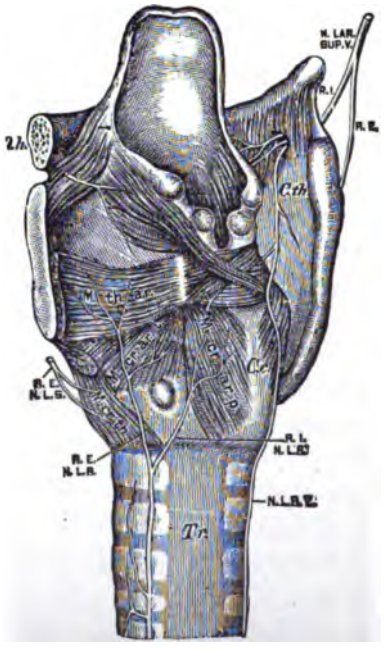
seal ring, with the seal projecting backward toward the vertebral column. It consists of an outer surface, an inner surface, and an upper border and a lower border. The outer surface gives attachment in front and at the sides to the crico-thyroideus muscle (Figure 10, M, cr, th,), and the inferior constrictor of the pharynx, and

presents on either side from before backward, the tubercle surmounted by a facet for the articulation of the lesser or inferior cornu of the thyroid cartilage, a rough depression for the attachment of the crico-arytaenoidæus posticus muscle (Figure 12, M, cr. aryt. pos.), a median, vertical ridge for the attachment of the fibres of the æsophagus. The inner surface is smooth and lined with the mucus membrane of the larynx. The upper border, inclined downward and forward, gives attachment in front and at the sides, to the cricothyroid membrane or ligament (Figure 8, M,), and the crico-arytænoidæus lateralis muscle (Figure 13, M, cr. ar. L.), and presents its posterior or highest part (Figure 11, C, c,) on either side of a slight median notch, and two small, oval facets for the articulation of the arytenoid cartilages (Figure 11, C. aryt.), the lower border horizontally connected to the first cartilaginous rings of the trachea (Figures 8 and 9, No. 2, 1.), by fibrous membrane of that canal. The arytenoid (Figure 11, C. aryt.), are two small, pyramidal cartilages which rest upon the posterior and the highest part of the upper border of the cricoid cartilage (C. c.), and present an anterior surface, a posterior surface, an external surface, a base, and apex. The anterior surface, convex and rough, gives attachment to the false vocal bands (Figure 14, 7), and the upper fasciculus of the thyro-arytaenoidaeus muscle (Figure 13, M, th. ar.); the posterior surface, excavated for the attachment of the arytaenoidaeus muscle (Figure 12, M, ar. tr.); the inner surface narrowest, flattened and covered with mucous membrane (Figure 14); the base, broad, presents a smooth concave facet for articulation with the cricoid cartilage, and three angles, of which two are prominent and important, viz., the anterior internal angle (Figure 14, 6), long and pointed, and giving attachment to the true vocal band and the lowest fasciculus of the thyro-arytaenoidaeus muscle; the posterior external angle (Figure 11), short and rounded, giving attachment to the cryco-arytaenoidaeus lateralis and posterior muscles, (Figure 13, M, cr. ar. L, M, cr. ar. p.) The apex is pointed, curved backward and inward, and articulates on either side with the cornicula laryngis (Figure 11, C. s.) which consists of two small nodules of elastic cartilage joined to the apices of the arytenoid cartilages, which apices they prolong backward and inward. The cuneiform cartilages, or cartilages of Wrisberg (Figure 11, C. w.), consist of two small rods of yellow elastic cartilage, directed upward and outward in the free border of the arytaeno-epiglottidean folds (Figure 11, L. ary. epig.), a little in front of the arytenoid cartilages. Their anterior extremities are slightly enlarged.

THE EPIGLOTTIS.

(Figure 12, E. Figures 8 and 9, No. 4. Figure 14, No. 4.) The epiglottis consists of a median lamella of yellow elastic cartilage in the form of a leaf with the stalk below and the lamella, or expanded part, above; the apex long, narrow, and attached by the thyro-epiglottidean ligament to the upper part of the receding angle of the thyroid cartilage. The base is broad, rounded, and free. The anterior surface is free in its upper part, where it curves forward toward the base of the tongue, to which it is connected by the glosso-epiglottidean folds; adherent below, it is attached by the hyo-epiglottidean ligament to the upper border of the hyoid bone. The posterior border is free, concave from side to side, and convex from above downward, and covers the superior aperture of the larynx during the act of deglutition, or swallowing, and is studded by small, numerous pits for the reception of mucous glands. The lateral margins are directed backward and connected to the arytenoid cartilages by the arytaeno-epiglottidean folds. You will understand that these cartilages are covered by mucous membrane on their entire inner surface, and that for the most part the epiglottis, except at its attachments to the hyoid bone, to the thyroid cartilage and by the arytaeno-epiglottidean folds, is entirely covered by mucous membrane. These cartilages are connected by a number of membranes or ligaments which may be divided into an extrinsic set and an intrinsic set. The extrinsic ligaments are three in number and connect the larynx to the hyoid bone. The thyro-hyoid membrane or ligament (Figure 10, Lig. thyr. hyoid med.) is a broad, fibro-elastic membrane passing from the upper border of the thyroid cartilage to the upper border of the hyoid bone, being separated from the posterior surface of the hyoid bone by a loose cellular tissue, in which a bursa is usually found. It is thickest toward the middle, and perforated laterally by the superior laryngeal nerves (Figure 13). The lateral thyro-hyoid ligaments (Figure 10, lig. th. h. lat.), rounded, elastic cords, pass from the superior cornu of the thyroid cartilage to the extremities of the greater cornu of the hyoid bone. These ligaments often contain a small cartilaginous nodule. The intrinsic ligaments connect the cartilages of the larynx one with the other; on the one hand the cricoid to the thyroid and arytenoid, and on the other the epiglottis to the thyroid. They are the cricoid-thyroid membrane, crico-thyroid capsules, posterior crico-arytenoid ligaments, crico-arytenoid capsules, thyro-epiglottidean ligament, and a hyo-epiglottidean ligament. The crico-thyroid membrane or ligament (Figure

8, M.) consists of a yellow, elastic lamina, divided into a central portion, which connects the contiguous portions of the cricoid and thyroid cartilages, and two thinner lateral portions, extending from the upper border of the cricoid cartilage as far back as the crico-thyroid articulation, to the lower border of the inferior or true vocal band, uniting firmly with the latter, especially in front. The crico-thyroid encloses the lower cornu of the thyroid cartilage with the articulating facet with the side of the cricoid cartilage (Figure 11, C. l.). The posterior crico-arytenoid ligament is composed of short, but strong bands from the back part of the cricoid cartilage to the base of the arytenoid cartilage (L. cr, ar.). The crico-arytenoid capsular ligament is thin, surrounding the articulation between the cricoid cartilage and the base of the arytenoid, and is lined internally with synovial membrane. The thyro-epiglottidean ligament is a long, slender band connecting the apex of the epiglottis with the upper part of the receding angle of the thyroid cartilage. The



13.

POSTERIO-LATERAL VIEW OF THE LARYNX, SHOWING MUSCLES AND NERVES. O. h. hyoid bone ; C, th. thyroid cartilage ; C. c. cricoid cartilage ; Tr. trachea ; M. th. ar. thyro-arytaenoidaeus muscle ; M. cr. ar. p. posterior crico-arytaenoidaeus muscle ; M. cr. ar. l. lateral crico-arytaenoidaeus muscle ; M. cr. th. crico-arytaenoidaeus muscle ; N. lar. sup. v. superior laryngeal nerve ; R. I. internal branch ; R. E. external branch ; N. L. R. N. recurrent laryngeal nerve; R. I. N. L. R. internal branch of recurrent laryngeal nerve ; R. E. N. L. R. ; external branch of recurrent laryngeal branch of recurrent laryngeal nerve. [From Landois and Stirling's Human Physiology.]

hyo-epiglottidean ligament is somewhat indistinct, extending from the base, and amidst a considerable amount of adipose tissue from the anterior surface of the epiglottis to the upper border of the hyoid bone. To these may be added the superior and inferior thyro-arytaenoidaeus, which will be described when speaking of the vocal bands.

MUSCLES OF THE LARYNX.

The muscles of the larynx may be divided into two sets: those which control the glottis and those which control the epiglottis. The muscles of the glottis are four on each side and one in the middle line, namely, the crico-thyroideus, the thyro-arytaenoidaeus, the crico-arytaenoidaeus lateralis, the crico-arytaenoidaeus posticus and the arytaenoidaeus.

THE CRICO-THYROIDEUS

(Figure 13, M. cr. th.) arises from the front side of the cricoid cartilage, and is inserted into the lower border and inferior cornu of the thyroid cartilage, and is supplied by the superior laryngeal nerve. Its action is to tilt the thyroid cartilage forward, thus elongating and tensing the vocal bands.

THE THYRO-ARYTAENOIDAEUS

(M. th. ar.) arises from the lower part of the receding angle of the thyroid cartilage and the posterior surface of the crico-thyroid membrane, and is inserted by two fasciculi into the anterior surface of the arytaenoid cartilage and the anterior and internal angle of its base. It is supplied by the recurrent laryngeal nerve. Its action is to draw the arytenoid cartilage forward and thus shorten and relax the vocal bands. It also assists in compressing the sacculus laryngis, or ventricle of the larynx. The former action is that of its lower and stronger fasciculus, which lies parallel with and on the outside of the inferior or true vocal band. The latter action is that of its upper or thinner fasciculus, which lies on the outer side of the sacculus laryngis, or the ventricle of the larynx.

THE CRICO-ARYTAENOIDAEUS LATERALIS

(M. cr. ar. l.) arises from the upper border of the cricoid cartilage, and is inserted into the external or posterior angle of the base of the arytenoid cartilage. It is supplied by the recurrent laryngeal nerve. Its action is to rotate the arytenoid cartilages, so as to bring together the anterior or internal angles and the true vocal bands which are attached to them, and thus constrict the glottis.

THE CRICO-ARYTAENOIDAEUS POSTICUS

(M. cr. ar. p.) arises from the broad depression on the side of the posterior surface or portion of the cricoid cartilage, and is inserted in the external or posterior angle of the base of the arytenoid cartilage. It is supplied by the recurrent laryngeal nerve. Its action is to rotate the arytenoid cartilages so as to separate their anterior or internal angles and the true vocal bands which are attached to them and thus dilate the glottis.

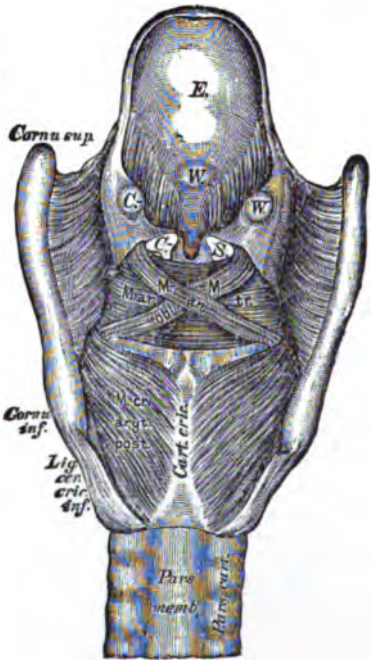


Fig. 12.

LARYNX FROM BEHIND WITH ITS MUSCLES. E. epiglottis with its cushion (w); C. W. cartilage of Wrisberg; C. S. cartilage of Sanitorini; Cart. cric. cricoid cartilage; Cornu T. sup. superior cornu of thyroid cartilage; Cornu inf. of the same. Lig. cer. cric. inf. posterior inferior crico-thyroid ligament; M. ar. tr. arytaenoidaeus muscle; Mem. ar. obl. oblique portions of the arytaenoidaeus muscles making the X; M. cr. aryt. pos. posterior crico-arytaenoidaeus muscle; Pars. cart. cartilagenous trachea; Pars. memb. membranous trachea. [From Landois and Sterling's Human Physiology.]

THE ARYTAENOIDAEUS

(Figure 12, M. ar. tr.) arises from the posterior surface and outer border of both arytenoid cartilages, presenting superficial, oblique, and deep transverse fibres. As the muscle runs directly transversely, except its oblique portions, it passes from the posterior surface of one cartilage to the other. It is supplied by both the superior and inferior or recurrent laryngeal nerves. Its action is to bring together

the two arytenoid cartilages and thus constrict the glottis, especially in its posterior part. Sometimes a small fasciculus, the kerato-cricoid of Merkel, extends below the preceding from the cricoid cartilage to the inferior cornu of the thyroid cartilage.

The muscles of the epiglottis are three in number:

THE THYRO-EPIGLOTTIDEUS,

or the depressor of the epiglottis (Figure 13), arises from the inner surface of thyroid cartilage external to the origin of the thyro-arytaenoidaeus, and is inserted into the margins of the epiglottis and the arytaeno-epiglottidean fold. Its action is to depress the epiglottis and assist in compressing the sacculus laryngis, or ventricle of the larynx.

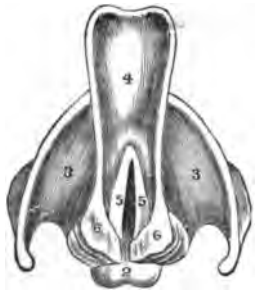


Fig. 15.

BIRD'S EYE VIEW OF THE INTERIOR OF THE HUMAN LARYNX AS SEEN FROM ABOVE. 2. Cricoid cartilage (back of). 3. Thyroid cartilage (internal lateral). 4. Epiglottis. 5. Vocal bands. 6. Arytenoid cartilages. [From Cohen's Throat and Voice.]

THE ARYTAENO-EPIGLOTTIDEUS INFERIOR

(Fig. 13.), or the compressor sacculi laryngis, arises from the arytenoid cartilage just above the false vocal band, and is inserted into the margin of the epiglottis. Its action is to depress the epiglottis and assist in compressing the sacculus laryngis.

THE ARYTAENO-EPIGLOTTIDEUS SUPERIOR

(Fig. 13.) arises from the apex of the arytenoid cartilage and is inserted into the arytaeno-epiglottidean fold. Its action is to constrict the superior aperture of the larynx during the second act of deglutition. The oblique fibres of the arytaenoidaeus are sometimes considered as belonging to the arytaeno-epiglottidei, which muscles would then decussate in the middle line behind the horizontal fibres of the arytaenoidaeus, or the arytaenoidaeus proper.

Having spoken to you of the membranes which unite the thyroid cartilage to the hyoid bone, it is necessary that I should now speak of those muscles which connect the larynx, or the outer surface of it, with the hyoid bone, and also of the connections of the hyoid bone with the base of the skull above and with the upper part of the breast bone in front. The hyoid bone consists of a body and four processes, and is horse-shoe in shape. The body is quadrilateral in its outline, situated in the middle line of the neck, and has a superior border, an inferior border, an anterior and a posterior surface. The superior border is thick and rounded, and gives attachment to the genio-hyoideus and genio-hyo-glossus muscles by its anterior lip, and to the thyro-hyoid membrane by its posterior lips. The lower border, thinner than the superior, gives

Fig. 16.

ANTERIOR VIEW OF MUSCLES OF THE NECK. 1. Posterior belly of the digastric muscle. 2. Anterior belly of the digastric muscle. 3. Hyoid bone. 4. Stylo-hyoideus muscle. 5. Mylo-hyoideus muscle. 6. Genio-hyoideus muscle. 7. Stylo-glossus muscle. 8. Hyo-glossus muscle. 9. Styloid process of temporal bone from which the styloid muscles arise. 10. Levator anguli scapalæ muscle. 11. Sterno-cleido mastoideus muscle. 12 Upper portion of breast bone or sternum. 13. Sternal end of the collar bone or clavicle. 14. Sterno-hyoideus muscle. 15. Sterno-thyroideus muscle. 16. Thyro-hyoideus muscle. 17. 18. Omo-hyoideus muscle. 10. Portion of the trapezius muscle. 20. Scalenus anticus muscle. 21. Scalenus posticus and medius muscles.

attachment to the sterno-hyoideus, the omo-hyoideus and thyro-hyoideus muscles. (Figure 16, No. 15, 17, 18.) The anterior surface is convex and looks upward and forward, and is marked by a crucial ridge. The part above the ridge gives attachment to the hyo-glossus (8), genio-hyoglossus (16), and stylo-glossus. The part below the ridge gives attachment to the mylo-hyoideus (5), the stylo-hyoideus (7), and the aponeuroses of the digastric (1). The

posterior surface, smooth, and concave looks backward and downward, and is separated from the epiglottis by the thyro-hyoid membrane and a quantity of loose, oreolar tissue (Figure 14,) in which a bursa is usually found. The greater cornu project backward and slightly upward, and give attachment superficially to the hyo-glossus muscles (8), internally to the middle constrictor of the pharynx, and externally to the thyro-hyoid muscle. (Figure 10, M. th. hyoid. or Figure 16, No. 16.) The inferior cornu, smaller, conical, project upward and backward from the point of junction of the body and the greater cornu, and give attachment to the stylo-hyoid ligament. (Figure 16, 9.) The ligaments which suspend the hyoid bone from the under surface of the skull are known as the

Fig. 14.

INTERIOR VIEW OF RIGHT HALF OF THE HUMAN LARYNX. 1. Upper ring of the trachea or windpipe. 2. Cricoid cartilage. 3. Thyroid cartilage. 4. Epiglottis. 5. Vocal band (vocal cord). 6. Arytenoid cartilage. 7. Ventricular band (so-called false vocal cord). [From Cohen's Throat and Voice.]

STYLO-HYOID LIGAMENTS.

These ligaments are attached to the lesser cornu of the hyoid bone, and come from the styloid process of the temporal bone at the base of the skull, the bone being so suspended by these two ligaments, one on either side, that the muscles coming from above to the hyoid bone, and the muscles coming from below to the hyoid bone can act upon it to tilt first the body of the bone towards the thyroid cartilage, or the greater cornu of the bone towards the thyroid cartilage—the reverse when the anterior muscles going to the chin contract. In this way the upper portion of the larynx is suspended to the base of the skull, and is subject to muscular action.

Now to return to the lining membrane of the larynx and the whole of the vocal apparatus. The mucous membrane of the larynx is stretched on entering the larynx between the arytenoid cartilages

and the epiglottis, forming the arytaeno-epiglottidean folds. These contain the thyro, and the arytaeno-epiglottideus muscles. the cornicula-laryngis and the cartilages of Wrisberg, and a large amount of loose cellular tissue, the occasional infiltration of which constitutes the so-called œdema of the glottis. It is thin, and of a pale, rosy color. It is particularly thin and adherent over the epiglottis, and still more so over the true vocal bands where it is transparent enough for the ligamentous fibre to be seen through its substance. (Figure 17, No. 5.) Its epithelium is columnar, ciliated below the ventricular bands, and also in front as high as the middle of the epiglottis. Above these points it loses its cilia, and gradually becomes of the squamous form. It is squamous over the vocal bands (5). It is highly sensitive in the upper part of the larynx. The mucous glands are simple tubular and conglomerate, particularly abundant over the posterior surface of the epiglottis, in which situation they are received into numerous small pits in the substance of the cartilage.

Fig. 17.

NATURAL SIZE OF VOCAL APPARATUS VIEWED FROM ABOVE. 1, 1, 1. Rings of the trachea or windpipe. 2. Cricoid cartilage. 3, 3, 3, 3. Thyroid cartilage. 4, 4, 4. Epiglottis. 5, 5. Vocal bands (so-called true vocal cords). 7, 7. Ventricular bands (so-called false vocal cords). 8, 8. Back part of the tongue. M. Crico-thyroid membrane. [From Cohen's Throat and Voice.]

They are found everywhere beneath the mucous membrane except over the vocal bands. The glands of the sacculus laryngis, or ventricle of the larynx, from sixty to seventy in number, pour out their secretions upon the inferior or true vocal bands, which they are designed to lubricate. The so-called arytenoid glands are collected into a somewhat large mass in the arytaeno-epiglottideus fold in front of the arytenoid cartilages. The vessels, nerves, and arteries, are the laryngeal branches of the superior and inferior thyroid. The veins open into the superior, middle, and inferior thyroid. The lymphatics terminate in the deeper cervical glands. The nerves are the superior and the inferior, or recurrent laryngeal branches of the pneumogastric or vagus nerve, and filaments from the sympathetic.

The superior laryngeal nerve supplies the mucous membrane and the crico-thyroid muscle, and in part the arytenoid. The inferior, or recurrent laryngeal nerve supplies in part the arytenoid and the other muscles except the crico-thyroid.

The interior of the larynx may be divided into two parts by the glottis.

THE GLOTTIS

Consists of an anterio-posterior opening comprised between the inferior or the true vocal bands, in its anterior three fourths, and between the arytenoid cartilages in its posterior one fourth. In tranquil breathing (Figure 18), it is triangular with the base back-

Fig. 18.

IMAGE OF THE LARYNX IN RESPIRATION VIEWED FROM ABOVE. 3, 3. Thyroid cartilage. 4. Epiglottis. 5, 5. Vocal bands (so-called true vocal cords.) 7, 7. Ventricular bands so-called false vocal cords). [From Cohen's Throat and Voice.]

wards; it is lozenge-shaped when fully dilated, as in violent inspiration; it is reduced to a narrow slit when sound is emitted. The vocal bands then lie parallel to each other, and their degree of approximation or tension increasing with the height of the sound produced. (Figure 19.) In the adult male it is nearly half an inch

Fig. 19.

POSITION OF THE VOCAL BANDS ON UTTERING A HIGH NOTE. [From Landois and Stirling's Human Physiology.]

or 8 m. m. long, and may be dilated nearly half an inch or 8 m. m. In the female, and in the male before puberty, its dimensions are about one third less. The inferior or vocal bands extend from near the middle of the receding angle of the thyroid cartilage (Figure 14, 5), below the ventricular band, to the anterior and internal angle of

the base of the arytenoid cartilages. These consist of a strong band of yellow elastic fibre, the inferior thyro-arytenoid ligament, which band is continuous inferiorly with the lateral portion of the crico-thyroid membrane, and is covered internally by a very thin adherent layer of mucous membrane, and is strengthened externally by the thyro-arytenoid muscle.

THE PART ABOVE THE GLOTTIS

is broad and triangular, and presents for examination the superior aperture of the larynx, the superior or ventricular bands (or improperly called false vocal cords), and the ventricle of the larynx.

THE SUPERIOR APERTURE OF THE LARYNX

Is triangular, obliquely inclined downward and backward, and bounded in front by the epiglottis (Figure 17, 4), and laterally by the arytaeno-epiglottidean folds. (Elevated margins to the inside of No. 3.)

THE SUPERIOR BANDS,

or improperly called false vocal cords, but properly called ventricular bands (7), extend from near the middle of the receding angle of the thyroid cartilage above the vocal bands, to the anterior surface of the thyroid cartilages. They consist of a fold of mucous membrane containing a thin band of yellow elastic fibre, the superior thyro-arytenoid ligament, from which a delicate expansion extends over the sacculus laryngis. They bound superiorly the openings of the ventricle of the larynx.

THE VENTRICLE OF THE LARYNX

(space between 5 and 7), is a deep, oblong, sacculated depression, comprised between the superior and inferior vocal bands, or, rather, the ventricular bands above, and the inferior or vocal bands below, and corresponds externally to the thyro-arytenoid muscle. It is continued superiorly and in front by a narrow opening into the sacculus laryngis, or laryngeal pouch, a prolongation of the foregoing which passes upward and forward between the superior or ventricular bands and the thyroid cartilage, and is covered externally by the thyro-epiglottideus, and by the thin, upper fasciculus of the thyro-arytenoid, and internally by the arytaeno-epiglottideus inferior, or the compressor sacculi laryngis. The mucous lining of this pouch is supported by an expansion from the ventricular band, and presents the openings of from sixty to seventy mucous glands whose secretions lubricate the vocal bands.

is flattened from side to side above, circular below, and continuous inferiorly with the canal of the trachea. (Figure 20.)

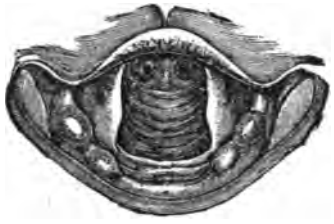


Fig. 20.

VIEW OF THE RINGS AND BIFURCATIONS OF THE TRACHEA FROM ABOVE. [From Landois and Stirling's Human Physiology.]

THE THORAX AND LARYNX.

LADIES AND GENTLEMEN: It is our duty as teachers of articulation, to study the wonderful instrument of speech with which we have to deal; and I think, therefore, that we should pay the greatest attention to the lectures of Dr. Hewson upon the anatomy of the vocal organs. Few of us can ever again have the opportunity of seeing the instrument of speech taken to pieces before our eyes and described, part by part, in plain untechnical language that any one can understand. I propose to follow in the footsteps of Dr. Hewson, and consider the same parts in relation to our work. The subject of my lecture today will therefore be:

THE THORAX AND LARYNX.

The thorax is the treasure-house of the human body,—a veritable strong-room, girt about with walls of bone for the protection of those precious organs the heart and lungs. Let us imagine ourselves for a moment inside the thorax, but first, with your permission, let us empty this safe-deposit vault of its valuable contents, so that we may have space for exploration.

We find ourselves in a dark room or vault with a door in the roof. The floor of this vault, instead of being firm and solid, is a soft membrane or muscle,—not flat like an ordinary floor, but dome-shaped like the top of an open umbrella. The door above is a sort of double trap door set at an angle instead of being flat, and opening upwards. But the most extraordinary thing about this room is, that the floor is in constant motion, heaving upwards and downwards in regular pulsations. The trap doors also are in motion; now they are opened so that a glimpse can be obtained of passages above, and now they come together with a quivering motion, opening and shutting with great rapidity, and causing a vibration that

makes the whole thorax tremble. The walls also are in motion, the whole room alternately increasing and diminishing in size.

A membranous muscle when it contracts tends to become flat and tense; and many of us have had the idea that the diaphragm or dome-like floor of the thoracic cavity, in contracting becomes flat like the head of a drum. Dr. Hewson, however, has shown us that this idea is incorrect, for the central portion of the diaphragm, if I understood him correctly, is attached above by ligaments and tissues to the bony walls of the thorax, so that it is incapable of descent. The circumference or edge, also, is attached. When, therefore, the diaphragm contracts, the dome-like floor becomes somewhat conical in shape. As I picture the action in my mind, it is as though the dome of the capitol in Washington were to change into a cone somewhat like a blunt church spire.

When, then, the diaphragm contracts, the thoracic floor becomes tense and somewhat conical in shape, and the cavity of the thorax is thus enlarged. When the muscular fibres relax, the tense floor becomes loose and baggy, resuming its dome-like shape, and the space within the thorax then becomes less. Continuing our explorations we find that the front or chest wall of the thorax is capable of slight motion. By the operation of muscles, described by Dr. Hewson, the ribs can be raised to a limited degree, so as to cause an increase in the circumference of the chest, and thus an expansion of the thoracic cavity. In animals which are prostrate gravity helps the expanding action, but in man, on account of his upright position, the weight of the bony framework renders a distinct effort necessary in order to elevate the chest wall, and relaxation of the muscles tends to collapse and consequent contraction of the thoracic cavity.

It will thus be seen that the interior capacity of the thorax can be increased; (1) by the contraction and consequent depression of the diaphragm; (2) by the elevation of the front wall of the chest; or, (3) by both actions performed simultaneously. When the interior capacity is increased, the air within the thorax expands to fill the increased space, thus becoming rarified. If the trap doors are open the denser air of the atmosphere then presses its way into the thorax to supply the partial vacuum. The act of inspiration is completed when the air pressures within and without the thorax are equal. If now the interior capacity of the thorax be diminished, the contained air by compression becomes denser than the air outside, and therefore tends to rush out, and the act of expiration is completed when the air pressures within and without are equal.

Exhalation can be effected; (1) by relaxation of the diaphragm which rises into its dome-like shape; (2) by relaxation of the muscles that raise the ribs, thus allowing the front wall of the chest to fall; or (3) by both processes performed simultaneously. We cannot, however, by any of these means produce that forcible expulsion of air that is requisite for speech, for relaxing muscles cannot exert compressing power. What we need for speech is a forcible compression of the thoracic cavity. Dr. Hewson has shown us that this is effected by the abdominal or waist muscles. The contraction of these muscles produces a compressing effect upon the viscera, just as though a rope were passed around the waist and drawn tightly. This compression forces the viscera upwards against the under side of the diaphragm. The diaphragm is thus pushed up into the thoracic cavity, compressing the contained air. In this way forcible emission of air is caused by the contraction of the abdominal muscles, and these are the muscles that we employ in throwing out the voice. For example:—Prolong a vowel sound, suddenly increasing the force into a shout, a number of times in succession, without stopping the voice, thus:—ah, AH-ah-AH-ah-AH. At every shout a forcible contraction of the abdominal muscles can be felt by the hand, and the front wall of the chest is thrown upwards by the force of the compressed air within the thorax, pulsating outwards with every shout.

Alternate inspiration and expiration, result from alternate expansion and contraction of the thoracic cavity. This can be effected in two ways.

We can expand thc cavity; (1) by using muscles that tend to raise the ribs and cause them to separate from one another slightly; and (2) by depressing the diaphragm.

We can contract the cavity; (1) by allowing the chest wall to fall, using muscles that tend to bring the ribs nearer together; and (2) by employing the abdominal or waist muscles.

Of these two possible modes of action, it will be seen that one involves the expenditure of less energy than the other. It is less laborious to breathe by using the diaphragm and waist muscles, than by moving the heavy bony framework of the chest.

When the diaphragm contracts, changing from the dome-like to the conical shape, it presses downwards upon the viscera, thus causing an expansion of the abdominal cavity. When the abdominal muscles contract, the circumference of the waist diminishes.

Thus in natural breathing, produced by the alternate action of the diaphragm and abdominal muscles, the circumference of the waist increases during inspiration, and diminishes during expiration.

I doubt the advisability of directing a pupil's attention to these motions, for his attempts at reproduction are often attended by ludicrous results. The end desired would, I think, be better attained by directing his attention to the chest, and not to the abdomen. Get the pupil to expand the chest and keep it continuously expanded even when breathing out. If the bony framework of the chest is kept raised and fixed, breathing can only be performed by the diaphragm and waist muscles ; and, as the pupil cannot help breathing, nature will work the proper muscles without his knowledge or will.

This effort of continuous expansion can only be sustained for a few minutes at a time without fatigue by persons unaccustomed to the exercise ; but if persevered in day after day the pupil can acquire the power of sustaining the chest wall continuously during his waking hours. The exercise usually results in a marked increase in the capacity of the chest. I have known of instances where the circumference of the chest has increased between two and three inches after a month's practice. When we consider that the thorax is the storehouse of the lungs, it is obvious that this increased capacity cannot but be beneficial to health. Deaf children, especially, require exercises of this sort, because their lungs have not been so fully exercised as those of ordinary children.

I consider this exercise of chest expansion as more beneficial to pupils than the breathing exercises that are usually employed. Conscious regulation of the breath is to be deprecated for the following reason: the primary object of breathing is the oxygenation of the blood, and the getting rid of the products of combustion in the lungs. We take in air to oxygenate the blood. We exhale to get rid of carbonic acid gas and aqueous vapor. The proper time to take in breath cannot be dicated to a pupil without interfering with the primary function of the lungs. Nature gives the signal for inspiration when the blood needs oxygenation, and when we attempt to regulate the breath consciously we are apt to interfere with the circulation of the blood. Breathing exercises should be stopped the moment dizziness is produced, for that is nature's indication of a disturbance in the circulation.

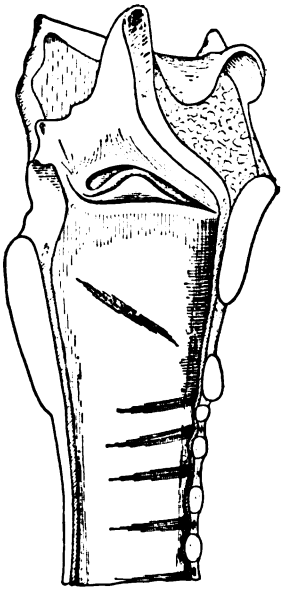
Inspiration is utilized for the oxygenation of the blood, and expiration alone is employed in the production of speech, Observe

the breathing of a person engaged in conversation at a time when he is unconscious of your observation. You will find that many words are articulated between each inspiration. The time taken for inspiration is instantaneous, whereas the duration of the expiration is very long. The breath comes in quickly, and goes out slowly. This means that the trap doors in the roof of the thoracic cavity are opened widely during inspiration, and closed so tightly during the act of speech, that only a fine stream of air can escape from the thorax. The prime requisite for speech is a store of compressed air, which can be let out little by little, as wanted. Compression is effected by the action of the abdominal muscles, but it is obvious that the air would escape with a gush unless restrained. The trap doors already alluded to, constitute the chief means by which a too rapid escape of air is prevented. These trap doors are known as the vocal cords, and they are contained in the larynx.

THE LARYNX.

Fig. 1.

Vertical section of the Larynx as seen from behind.



Vertical section of the Larynx as seen from the side.

The larynx may be considered as the guard-house of the lungs, —admirably adapted to protect them from injury. It consists essentially of a box, surmounted by a movable lid, called the epiglottis, which closes during the act of swallowing, to prevent food from

entering the lungs. Inside this box are two pairs of valves. The lower pair, called the true vocal cords, stand with their free edges upward, and the upper pair, known as the false vocal cords, hang with their edges downwards. The lower pair constitute the trap doors to which I have before alluded.

The specimens of the larynx which have been placed in your hands by Dr. Hewson, will have shown you that the vocal cords do not look like "cords" or strings at all—nor perhaps are they very suggestive of trap doors—they look more like lips. In fact, we may consider that we have a pair of lips within the larynx capable of approximation, with various degrees of tension.

The false vocal cords also resemble lips, but it is doubtful whether they can be approximated sufficiently to touch one another. If the lips of the throat are shut and the abdominal muscles are contracted, the air compressed within the thorax tends to blow the vocal cords apart. The muscular tension may be so adjusted as to allow the vocal cords to yield sufficiently to permit of the escape of a puff of air—the aperture closing again immediately and remaining closed until the pressure within the thorax causes the escape of another puff. In this way a regular series of puffs may be produced, the alternate opening and closing of the glottis constituting vibration of the vocal cords. The frequency of the vibration depends upon the tension of the vocal cords. The more tightly they are drawn, the more rapid will be the vibration produced.

With slow vibrations, distinct puffs of air can be heard, producing a sound known as "throat trill." If the glottis is opened and closed more than thirty-two times in one second, the ear fails to distinguish the individual puffs, and perceives only a continuous effect of a musical character denominated "voice." The pitch of the voice rises as the vibrations become more rapid.

There are two ways of varying the pitch of the voice, just as there are two ways of changing the pitch of a violin string. Observe the violinist tuning his instrument. He turns a peg at the end, thus tightening the string. At each increase of tension the pitch of the string becomes higher. When, however, he plays the instrument, the pitch is varied in a different manner. He presses his finger upon a string so as to permit only a portion of the string to vibrate, instead of the whole—and the pitch becomes higher. The shorter the vibrating portion, the higher is the pitch produced. In this case the tension of the string remains uniform.

In a similar manner variations of pitch in the voice may be produced by allowing a portion only of the vocal cords to vibrate, instead of the whole. Observations made by means of the laryngoscope, seem to indicate that the variations of pitch, in what is termed the "head register" of the voice, are produced in this manner; whereas, in the "chest register," the vocal cords vibrate as wholes, and the changes of pitch are produced by variations of tension.

Vocal cords vibrating in part.

Vocal cords vibrating as wholes.*

Dr. Hewson, during the course of his lecture, gave utterance to rather a startling remark. If I understood him correctly, he expressed the opinion that some of the vowel sounds are formed in the larynx, and not in the mouth. I cannot agree with him in this opinion, although I am aware that he can quote authorities in support of his position. For example: Dr. E. M. Moore, of Rochester, N. Y., has published an account of the following case:† Some years ago Dr. Moore attended a man who had attempted suicide by cutting his throat. The cut was immediately above the thyroid cartilage, shaving off the epiglottis at its base. The wound resulted in an oval opening, two inches long by three quarters of an inch wide. The man was able to talk at any time by bending his head forward and temporarily closing the opening. When the head was thrown back he lost the power, but Dr. Moore noticed that under such

* These cuts are reproduced from "Voice, Song, and Speech."

† See Transactions of the New York State Medical Society, 1872, pp. 276-282.

circumstances he could pronounce vowel sounds like ah, oh, etc. The doctor was surprised at the clearness and distinctness of the vowel effects, for the sounds seemed to emanate from the yawning wound in the throat, and not from the mouth. Struck by this circumstance, the worthy doctor made a unique experiment. He introduced into the wound a sheet of buckskin, so placed as to prevent the possibility of any air passing from the larynx into the mouth. The only outlet left for the breath, was the aperture in the throat. He then asked the man to repeat the alphabet, A. B, C, etc. Dr. Moore found that under these circumstances, certain vowel sounds could be distinguished, and he came to the conclusion that these vowels were formed in the larynx, and not in the mouth.

This conclusion would be more reliable if he had shown that the man could pronounce these vowels with his mouth shut. Of course, if the vowels heard were really produced in the larynx alone, the closure of the lips would have made no difference in the effect. Whereas, if the ordinary theory is correct, that vowel quality is due to the resonance of the mouth cavities, then the closure of the mouth passage, at both ends, would have been fatal to the effect.

I understand that during the course of the experiment, the man moved his mouth as though he were speaking; and Dr. Moore simply took precautions to prevent the passage of air through the mouth. The mouth positions for the vowels were, therefore, assumed, and the mouth would then, in effect, be a resonator, tuned to the vowel positions, held near a sounding body—the larynx. Under such circumstances, resonance effects should be produced without the actual passage of air through the mouth, just as an ordinary resonator, when properly tuned, becomes sonorous when held near a vibrating tuning fork.

I cannot look upon the experiment as by any means conclusive; and I know of no other facts to support the hypothesis that any of the vowels are formed in the larynx, independently of the mouth.

A number of years ago Dr. McKendrick, of Glasgow University, afforded me an opportunity of examining the speech of a man whose larynx had been excised. The patient had been supplied with an artificial substitute for the larynx, made, I think, of dentist's rubber. As there were no vocal cords, the man could only speak in a sort of whisper, which was barely audible. A small aperture had been left in the front part of the rubber substitute into which the man slipped a metal reed, taken from a harmonium or small parlor

organ. Upon then attempting to speak, the reed was thrown into vibration by the air from the lungs, and a good sonorous voice resulted, —resembling the natural voice to a remarkable and startling degree. The patient spoke with a broad Scotch accent, and his articulation was simply perfect. Very little peculiarity could be detected in the artificial voice excepting that it was monotonous and without inflection. The speech was so natural in quality that it was difficult to realize that the source of sound was a metal reed inserted into the throat.

The man was a machinist by trade, and he employed his spare time in manufacturing reeds for himself. He had quite an assortment for experimental purposes, and he let me hear the effect of reeds of various sizes and materials. He could change his voice from bass to tenor, and from tenor to soprano at will, by employing suitable reeds.

The point to which I would direct your attention is this;—that the vowels were all perfectly produced, althongh the larynx had been excised.

We have seen that a metal reed can be used in place of the vocal cords; and I am inclined to think that the real larynx, if detached from the body and operated by means of a wind chest or organ bellows, would produce an effect more resembling the sound of a beating reed, than the human voice. The quality or "timbre" of the human voice, I believe, is due in a very minor degree to the vocal cords, and in a much greater degree, to the shapes of the passages through which the vibrating column of air is passed.

MR. WESTEEVRLT: Do you intend to tell anything of the false vocal cords ?

MR. BELL: I really do not know what their function may be. As the shape of the passage above the vocal cords controls the quality or *timbre* of the voice, we may be sure that the false vocal cords exert some influence upon the quality of the voice, especially if they are capable of approximation, a point I am unable to decide. The ventricles, also, the spaces between the true and false vocal cords on either side, should, theoretically, exert an influence upon the quality of the voice, for they constitute two small resonance-chambers, situated close to the source of sound. In the howling monkey the ventricles are expanded into pouches, and the characteristic howl produced by the creature is due to the resonance of air in those chambers.

MR. CROUTER: I would like to ask the president, in the case of the Scotchman who introduced the reeds into his throat, if the different tones were not due to the difference in the reeds.

DR. BELL: The pitch of the voice heard was undoubtedly due to the reed employed, but the quality of the voice, and the consonant and vowel effects were due to the passages above, through which the vibrating column of air was passed.

I have already directed your attention to the case reported by Dr. Moore of Rochester, New York, in which he claimed that certain vowels are formed in the larynx and not in the mouth. Dr. Moore directed my attention to the case of another patient of his which seems to prove the converse proposition. * Dr. Moore had performed upon this man the operation of tracheotomy. At the time I saw him the patient for over twenty years had been dependent for life upon air supplied through a silver tube inserted in the trachea. The glottis had become completely closed and no air could be forced through the larynx into the mouth. The strange feature of the case was that under these circumstances the man could talk. Of course the speech was peculiar on account of the absence of voice, but there was no dicffiulty in understanding it. In this case the air which was moulded into speech came not from the lungs, but from the pharynx. If we close the lips tightly and compress the air in the mouth and make an effort to blow, the pharynx expands under the pressure of the confined air, just as a rubber ball would expand if you were to blow into it. Upon opening the lips the contraction of the pharynx causes a sudden puff of air. A puff of air of this character can be produced even though the glottis is closed. By long practice this man had acquired such expertness in the use of the muscles about the pharynx that he could produce explosive effects of this kind which could be distinctly heard at a distance. When he spoke, the consonants were formed with very great firmness, and the removal of the consonant position resulted in a puff of air through the vowel positions assumed by the mouth, so that the puff had vowel quality sounding like a whispered vowel. I can imitate the character of his speech so that you may understand, more clearly than I can describe it, the nature of his articulation.

[Dr. Bell then spoke a few sentences illustrating the peculiar speech of the man.]

*Case of Edward Matthews. See Transactions of the New York State Medical Society. 1872. pp. 270-282.

The point that I would have you observe is, that in this case vowel effects were unmistakably produced, although no air passed through the larynx into the mouth.

DR. HEWSON: Do I understand you to say that this individual who had the larynx closed, made audible speech?

DR. BELL: Yes, sir; quite audible speech.

DR. HEWSON: I merely wish to make a statement from actual surgical experience that, in cases where the operation of tracheotomy has been performed, it is impossible to make any sound under such circumstances, unless the finger is placed over the tube in the trachea. Now, of course, that may be due to the condition which you have already indicated; that is, that the speech was produced by this individual by long practice. Now it is possible for people to speak when that tube is closed, even though the principal part of the vocal apparatus is lined with diphtheric membrane. There is some sort of sound made, at least, but there is no audible speech. The remark I made some time ago about the vowel sounds being made in the larynx, I will amend by saying that of course the experiments that you have had the opportunity of seeing, had not come to the notice of either myself or the gentlemen who have preceded me, in making statements in text-books from which I have quoted. Your experience, I believe, is very unique; because I have never heard of any one who had been able to see the experiments, made as you have detailed them to-day. With reference to the closure of the upper part of the vocal apparatus by diphtheric membrane, and the introduction of a tube into the trachea; I may say that in order that any sound may be produced at all, the tracheal tube must be closed. Now, if the parts above, are almost closed by the diphtheric membrane, no sound is produced. However, I can readily see, from a knowledge of the muscular tissue surrounding the parts, that such sounds could be produced as you have detailed in this individual.

DR. BELL: In the case of this individual I have just mentioned, no air could pass up into the mouth, under any circumstances. The aperture in the windpipe remained open, and, all the time he was speaking, air gushed out of the tube in his throat, forming a whistling accompainment to his speech.

(*Adjourned until 2 o'clock.*)

SCHOOL OF PRACTICE.

THURSDAY AFTERNOON, JULY 2, 1891.—2 P. M.

The School of Practice was opened by Miss Caroline A. Yale, who asked Mr. Paul Binner, Principal of the Milwaukee Day School for the Deaf, to explain his system of teaching.

MR. BINNER: Ladies and gentlemen, I will first give you a brief explanation of what I call the three positions. The first position is with the corners of the lips drawn back, similarly to a slight smile. In this position the vowel ē, ĕ, ā, and ă are given; and the vocalized and non-vocalized consonants s, t, d, th, n, l, r, x, f, and v.

The second position, which comprises the largest vertical opening of the lips in the ē position, produces ä and å. The consonants in the second position are p, b, and m.

The third position is the forward position of the lips. In the vowels a̤, ŏ, ō, o͞o, the lips are pushed gradually forward, the tube being longest in the o͞o. The consonants in the third position are sh, zh, w, and wh,. All the dark vowel sounds, as ē, ĭ, are classed with the third position.

Having thus divided the vowels and consonants according to the form and position of the lips, we find that the pupils learn them more readily. Hearing people adjust the cavity of the mouth for the different vowels by lowering or raising the tongue, something which cannot be seen; and they are guided by the ear in regard to their correctness. The deaf cannot do that, therefore the more simply we can arrange the elements for them, the easier it will be for them to pronounce correctly.

The importance of the second position becomes evident in the combined vowels ī, ow, which consist of ä, ē, and ā, o͞o. It is sufficient for all the general requirements of speech to observe

the first and third positions, because these are prominent positions: for in going from the first to the third position we glide over the second, and *vice versa.*

Teaching the deaf to speak and lip-read by this method offers no new obstacles; for the teacher has a simple but solid, scientific basis to work upon; and the positions of the vowels and consonants as given here do not present an undue amount of prominence, which might be detrimental to the pupils in reading from the lips of a stranger.

Prof. Binner here gave an exhibition with two of his pupils, both of whom had just finished the second year. One was said to have lost hearing at eight months, the other before she was a year old.

Miss Frances Wettstein, of the Milwaukee Day School for the Deaf, went through some exercises with these pupils. In answer to a question she said the boy was a German and the girl Polish. Mr. Binner added that their surroundings at home were not what might be called good. All the education these children had they had received in school. Both were totally deaf.

THE PRESIDENT: The professor would be glad to answer any questions put to him by the Association.

MR. BINNER: There is one more thing I want to say, and that is in regard to language. Perhaps you noticed that the pupils gave complete answers. I demand that of all the pupils in the lower grades; I always like to see these complete answers kept up until the third year. After that, if the teacher deems it necessary, she may demand full answers or not according to her discretion. The point that I have in view in having the lower grades answer fully, is the matter of language. I think our pupils get language a great deal better by being obliged from the very first to answer in complete sentences. Fragmentary expression is certain to lead to disconnected thought. After they have acquired a command of language they may be allowed to use a shorter mode of answering. I think we find, when we look around among hearing schools, that they make the same demand upon their pupils in the lower grades: and I know that what is good for the hearing pupil is good for the deaf.

THE PRESIDENT: I notice, professor, your pupils have continuity of voice.

MR. BINNER: Yes, sir; there can be no good speech without it. I begin to teach continuity when they learn the first two words; for instance they must say "the-cow," not "the cow." There is much more economy in this than in saying "the cow." Breath and time are saved. I tried to show you that some of my vocal gymnastics tend toward that effect. They train the muscles of the chest and the lungs in such a way that a continuous breath can be used.

MISS ELIZA KENT: How many sounds do you teach before giving words?

MR. BINNER: Words and sounds are taught from the beginning. According to the method of teaching articulation in our school, the child may learn any number of practical, easy words. I call this the incidental work. There are no binding rules for the teacher. It is the *ad libitum* part of the first year's course. The prescribed work for the first year is the drill on sound, this takes precedence over everything else, and the teacher's work is judged by the pupil's ability to articulate individual sounds. The more thorough the drill on the elements has been, the greater will be the number of words acquired by the pupils, for it has trained his organs of speech. Looking at my charts you will notice that, contrary to custom, I begin the teaching of vowels with the sound of ē.

MISS YALE: Why is that?

MR. BINNER: Because I find that the pupils learn this sound more easily when taken first. And the reason for it is that the pupil's organs have not yet been trained on wide openings, such as for ä or a̤, and which are prominent to the eye. After having been trained on these open-mouth-vowels, their conception of a vowel sound with the close adjustment, which the ē requires, is more difficult.

THE PRESIDENT: It is interesting to note that a number of years ago some of my pupils made an examination of the relative frequency of the various English elements, and the vowel ē turned out to be the most frequent vowel in the English language.

MR. BINNER: I formerly found it the most difficult to teach; but now I do not.

PROF. J. C. GORDON: Why is it easier now than formerly?

MR. BINNER: Because I teach it before any of the other vowels are taught.

MISS FLORENCE C. MCDOWELL: How soon do you give them words?

MR. BINNER: If you mean language, I will say that I do not begin with that until they have gone through the elements. However, I wish to emphasize the fact stated before, that I teach words just as soon as I can, and that really means from the first day the pupil enters school.

MISS ELEANOR B. WORCESTER: How many consonants do you give before giving the printed vowels?

MR. BINNER: Both are taught almost at the same time. The pupils have the printed and written charts always before them; and as soon as the pupil writes or copies the first letters he is made acquainted with both the written and the printed letters.

MISS WORCESTER: Do you teach *a* in *a*rt the same as *a* in m*a*mm*a*?

MR. BINNER: I do.

MISS HARRIETTE E. HAMILTON: Do they have the spoken or the printed word first?

MR. BINNER: The spoken word.

DR. JOB WILLIAMS: How much time do you devote to your chart daily?

MR. BINNER: In the higher grades fifteen minutes; in the lower grades more, often as much as one hour.

Dr. WILLIAMS: Do you give them an hour at one time?

MR. BINNER: Yes, sir. The exercises are so diversified that they neither tire the pupil, nor suffer his interest to lag. The first hour in the morning is devoted to this work.

MISS YALE: Dr. Bell, I have a number of questions here for you to answer.

DR. BELL: The first question is: "Is it possible to constrict the false vocal cords?" I think that Dr. Hewson will be more competent than I am to answer that question.

DR. HEWSON: I cannot conceive of any muscular fibres constricting the ventricular bands, or false vocal cords.

MR. CROUTER: How was it with the Scotchman, Dr. Bell?

DR. BELL: There were no vocal cords in the case of the Scotchman, the vocal cords were represented by a harmonium reed.

I hardly know how to commence on the stream of questions you have set for me. They appear to be of very great importance, and I should be very glad if I can be of any assistance to teachers here in answering them. I may, perhaps, group them so as to answer two or three at one time.

(1) "Please illustrate the development of *ng*."

(2) "Dr. Bell develops non-vocal *r* from *th;* please demonstrate."

(3) "How would you develop *ch?*"

I will take up these in one group. In difficult cases you will find manipulation of the tongue of great assistance: and I think that this series of questions may be answered by showing you how to manipulate the tongue; and by directing your attention to the nature of the changes, you can produce by manipulation. You can push a position further back, and you can enlarge an aperture by manipulation; but you cannot do the converse. If, then, your pupil cannot pronounce a given sound, let him give a sound of similar formation but further forward in the mouth; then push the position back. For example; take the cases specified in the questions. (1.) The pupil cannot pronounce *ng*. Now, suppose he *can* pronounce *n* — a sound of similar formation but formed further forward in the mouth. Take a manipulator (for example; a paper cutter), and hold it in the pupil's mouth so as to cover the top or front part of the tongue. Now tell the pupil to say *n*. The point and front of the tongue being fettered, the back of the tongue alone is free to rise; and the attempt to say *n* results in *ng*. Now give the pupil a hand-mirror and tell him to keep his tongue still when you withdraw the manipulator. In most cases the pupil is at once able to pronounce *ng*, but in difficult cases it is advisable to get him to manipulate his tongue for himself, watching the effect in a hand-mirror.

(2) Your pupil cannot pronounce non-vocal *r*, but is able to give *th*. Place the manipulator under the tongue, and gradually lift the point of the tongue, while the pupil tries to sound *th*. The sound changes to a hiss, somewhat like *s*, then as the tongue is raised higher the sound becomes more like *sh;* and if lifted still higher, it becomes non-vocal *r*. When the correct position is reached, the point of the tongue is against the inner part of the upper gum—just where the palate commences to arch—with an aperture over the centre.

(3) The pupil cannot pronounce *sh*. Let him pronounce *th*. Place the manipulator over the tip of the tongue and push the tongue gradually back. The sound changes first to *s*, and then to *sh*. If pushed too far back, it becomes *yh* (*h* in the word *hue*); and if still further back, the German *ch* (back-centre aperture).

Another question is, "What would you do with a pupil who gives *ng* too far back?" I don't quite understand this question, for you can't get *ng* too far back. You can get *k* and *g* too far back, and these are very common defects. In such cases the back of the tongue is placed against the back of the pharynx instead of against the soft palate, but such a position cannot produce an *ng* sound, because the depression of the soft palate would not admit air into the nasal passages, the shut position being below the soft palate. It is very difficult to correct a position that is too far back. You can't put a hook into the tongue and pull it forward! I think the best plan is to start anew. Take a position too far forward in the mouth, and push the tongue backwards to the correct position. For example; where you have *k* too far back, take *t;* let the pupil try to pronounce *t*, while you hold the manipulator over the tongue so as to prevent any portion from rising, excepting the back. In this way you will be sure of a good *k*, if the pupil does not know what you are aiming at. By vocalizing the *k* you get *g*. (Dr. Bell illustrated his remarks by manipulating the tongue of a deaf pupil).

The next question is, "Please demonstrate that intelligible speech does not depend upon perfect vowel positions." I shall read a few sentences from a book, substituting for each vowel sound a mere indefinite murmur of voice. You observe that the articulation, though, of course, very peculiar, is perfectly intelligible.* We may learn from such an experiment as this, that consonants are much more important elements than vowels. Intelligibility of speech mainly depends upon the correct pronunciation of consonants. We could manage to get along very well with only one vowel sound, if indefinite enough, and yet make ourselves understood. I don't mean to advise you to teach speech of this character to your pupils, but many of you may be encouraged to know that very imperfect vowel sounds will not prevent your pupils from being understood by relatives and friends. Consonants are

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* Read the following passage aloud, giving an indefinite murmur of the voice for each dash, and the passage will be intelligible:—

- p-nt-d t- th- c-t -nd th-n t- -ts n-m -nd -nd-v-rd t- m-k h-m -n-rst-nd th- m-n-ng -v th- r-t-ng - -ls- t-t h-m t- sp-l th- w-rd -n h-s f-ngg-rs. -v-th-ng 'th-t h- d-d w-s p-rf-rmd w-th - p-nd-r-s s-rt -v -mf-s- -s th-t w-d h-v m-d - p-rs-n -nf-m-ly-r w-th th- d-f s-p-z th-t h- n- -l -b-t -t.—*From the Annals for January 1891, p. 45.*

You may substitute for the + (-) any large aperture vowel, such as *u* in *up*, *er* in *her*, *o* in *on*, or even *a* in *cat*, without destroying intelligibility.

much more easily acquired than vowels, and all pupils who can pronounce the consonants correctly can acquire a useful articulation, even though they murder the vowels. That is, their speech will be intelligible to hearing people, and therefore useful as a means of communication, even though it may not be very pleasant to hear. Too much effort, I think, is made to impart a niceness of pronunciation that is not appreciated by the outside world.

When I first entered upon the work of articulation teaching, I was very proud of the pronunciation of some of my congenitally deaf pupils. They had been drilled upon the elements and were able to pronunce words and sentences written in Visible Speech with absolute correctness, slowly, it is true, but with perfect elementary sounds. To my great mortification, however, I found that visitors generally preferred the imperfect gabble of some semi-mute to the elocutionary speech I had labored to impart. In those days I had a very poor opinion of the visitors, but I have since come to the conclusion that I myself was somewhat at fault. My aim was wrong. At that time I had the mistaken idea that it was hardly worth while teaching articulation at all, unless I could teach my pupils to *speak well.* My ear was sensitive to every mispronunciation, and I was constantly correcting my pupils for errors that were not even noticed by visitors to the school.

Our object is not to train elocutionists, but to help deaf children to make themselves understood. Intelligibility is of far greater importance than perfection. By all means let us get as perfect a pronunciation as we can, but do not let us spend much time on minor details of pronunciation that are of no consequence to intelligibility. Let us aim, not to get the speech of the elocutionist, ***but the speech of the people among whom the children live.*** Judged by the standard of the elocutionist, how many of the hearing people of the world talk well? Very few, and yet their speech is of inestimable value to them in all the relations of life.

Now, I hardly think it worth while attempting to teach the mass of the deaf to talk better than other people. Let us be satisfied with speech like that which we ourselves employ without troubling ourselves about niceties of articulation that might be all very well in an orator or public speaker, but which would be of no practical benefit to a deaf child in his own home. Observe your own utterance and the utterances of your friends, and you will find that half your syllables are pronounced in a slipshod fashion that would make an articulation

teacher shudder if given in the same manner by a deaf child. Take such little words as *and* or *of*. Who gives them their proper dictionary pronunciation in actual speech? No one but the deaf child. We pronounce them somewhat as though they were spelled *und* or *uv*. You *und* I; a cup *uv* tea. No one says *thee* boy, *Ann* apple, or *eh* pear in conversation. The obscure sound is heard, and our utterance is more like *thu* boy, *un* apple, *u* pear. The same indefiniteness of vowel sound is characteristic of all our unaccented syllables. Why, then, need we be particular about the pronunciation of the unaccented syllables in such words as, comfortable (kumf-t-ble), lesson (les-n), silent (sil-nt), sentence (sentnce), workman (workm-n, different (dif-r-nt, above (-buv), forgot (f-got), etc. Any sort of indefinite vowel sound will pass muster in these syllables if only softly uttered.

We are training our children to talk to ordinary people, not to elocutionists. There are certain points that must be attended to in order that the speech may be satisfactory to ordinary people; but in regard to other points, great latitude may be allowed.

Consonant elements and the vowels in accented syllables must be properly pronounced, but the vowels in unaccented syllables may be uttered in any sort of indefinite way without offending the ordinary ear. Accent and rhythm, I think, are of more importance than exact pronunciation.

In Visible Speech the voice symbol (ı) is used to indicate an indefinite vowel sound like *er* in the word her, or like the *er* sound used by public speakers to fill up gaps in their sentences—when—er—they are not—er—very—er—er—sure—er—what they want to say. This indefinite vowel sign I consider a perfect God-send to the teacher of articulation, enabling him to get rid of half the labor of articulation teaching. In spelling phonetically the vast majority of vocal sounds in the unaccented syllables may be represented by it; and it may also be substituted everywhere for glide *r*. I would recommend those who do not use Visible Speech to use a dash.

Ordinary people who know nothing of phonetics or elocution have difficulty in understanding slow speech composed of perfect elementary sounds, while they have no difficulty in comprehending an imperfect gabble if only the accent and rhythm are natural. Too much labor is bestowed upon unaccented syllables. Any child can give an indefinite vowel sound that may be combined rapidly with consonants. I have seen a teacher puzzling herself over the word *comfortable*. The first syllable gave no difficulty, but the second

syllable was not pronounced easily by the child. There was an attempt on the part of the pupil to give long *ō*, as in pole, followed by a consonant *r* of an exaggerated kind, and the teacher was trying to get the pupil to substitute *aw* for *o*. With regard to the last syllable the teacher was puzzled to decide whether the vowel should have the sound of *a* in table, *a* in cat, or *a* in ask. Now the fact is that the exact vowel sounds in the unaccented syllables are of no earthly consequeuce. An ordinary ear will accept any sort of indefinite sound as good speech, if the word is uttered rapidly with due accent on the first syllable. Even an elocutionist would not ask for a consonant *r* in the second syllable. He would simply demand a gliding of the tongue towards the position for *r;* but ordinary people do not give an *r* of any sort in a large proportion of cases, and it is certainly the case that glide *r* may be ignored in teaching a deaf child and taught simply as voice, without any ordinary person noticing any peculiarity, so that in the word "comfortable" the second syllable may be given as, *f* followed by the indefinite voice sign. (ᗒ, *f*–) So also with the vowel in the last syllable. The whole word, therefore, might be written ᑕ]ᗒᗒᓄᗒᘐ or kumf-t-bl. Pronounce the first syllable with due deliberation and care, and give tbe others rapidly and carelessly, and it will be satisfactory.

DR. WILLIAMS: With indefinite vowel sounds, is there not a danger of carrying that too far so as to get indefiniteness?

DR. BELL: You don't want to do that. However, it is the consonants that give intelligibility to speech. You may give every vowel indefinitely; but if the consonants are definite, you get intelligibility. If the accented vowels are given correctly, the unaccented vowels may be jumbled up somewhat.

DR. WILLIAMS: But if they get into the habit of giving the vowel sound in that indefinite way, won't they carry it into the accented vowels?

DR. BELL: Well, they might, just as we do. Of course, the better articulation you can get the better; but allow me to say that in ninety-nine out of a hundred persons you meet in ordinary society, that indefinite sound is carried into a great many accented syllables and also into nearly all the unaccented syllables.

The next question is, "In a whisper, are the vocal cords lax or tense?" In the case of a whisper there is a constriction; there is an obstruction to the passage of air in the glottis. The vocal cords

are not adjusted so as to permit of a definite musical vibration, so that the obstruction results in a rustling sound that we term "whisper."

PROF. BINNER: You mean constriction of the vocal cords?

Dr. BELL: Yes, a constriction of the glottis — the space between the vocal cords.

(*Adjourned until 9 a. m., Friday, July 3d.*)

Thursday evening a literary, musical, and social entertainment was given in the hotel parlor.

THE GROVE AT CROSBYSIDE—LAKE GEORGE.

HISTORY OF THE EDUCATION OF THE DEAF.

FRIDAY, JULY 3.—9 A. M.

MR. PRESIDENT, AND LADIES AND GENTLEMEN OF THE ASSOCIATION:—

It is my purpose this morning to give some account of what has been done for the education of the deaf within the present century. To appreciate this work we must understand something of the condition of the deaf before that time.

The deaf, it was believed, had neither the faculty of memory, nor the power of reasoning, and, since they could neither remember nor reason, they were deprived of all civil and private rights. They could neither inherit, hold, nor devise property. They could not be witnesses in any civil or criminal case; neither plaintiffs nor defendants in any court of justice. They could claim none of the rights which belonged to them as human beings, though treated as criminals, if they violated any of the laws.

In the sixteenth century Montaigne, the great French philosopher, said: "The deaf have no knowledge of God, therefore no knowledge of the law—where no law is there can be no transgression."

Again, "Language is the gift of God, therefore those who have been deprived by God of hearing, ought not to be taught language."

In the eighteenth century two of the best teachers the deaf ever had, the Abbe De l'Epée and the Abbe Sicard, held the same opinion of their mental condition, the Abbe De l'Epée ranked the uneducated deaf and mute with the brutes that perish. The Abbe Sicard said, "The deaf and dumb do not even possess the sure instinct by which animals are guided." "The moral world has no existence for them, and for them virtue and vice are without reality."

Guyot of Groningen, Eschke of Berlin and Cluser of Leipsic, the earliest German teachers, held similar views.

Deafness leaves the mind, they said, in entire ignorance and shuts the deaf out of communication with society.

There were a few remarkable cases in the sixteenth and seventeenth centuries of the deaf who could both speak and read from the lips, but these were thought to be miraculous. Sporadic efforts were made from time to time in Germany, France, Italy, Spain, and England, for the education of the deaf, but without permanent results. In the latter half of the eighteenth century, almost simultaneously in Germany, France, Italy, Spain, and England, schools were established. Two different methods of instruction were adopted.

The Germans, believing that ideas must always be associated with words, and that thought was impossible except through the medium of words, devoted their earnest efforts to the development of the mind through articulate speech and reading from the lips.

The first public school in the world for the instruction of deaf-mutes was founded at Leipsic in 1778, by the Elector of Saxony under the directorship of Samuel Heinicke with nine pupils. His method of teaching he kept secret. When the Abbe De l'Epée applied for information as to his method, he replied that it was his private property, which he refused to divulge. We have, however, an account of one way by which he taught the vowel sounds. He placed five bottles on a table before the class. In one of them he put vinegar, in another pure water, in another sweet water, in another sweet oil, and in the fifth wormwood. In each of these bottles was a little feather or brush. When he wished to teach the pupil the vowel *i*, he took the brush from the vinegar bottle and put it upon the tongue of the pupil and indicated the position of the lips, mouth and tongue necessary to produce the sound of *i*. So when the pupil tasted vinegar he pronounced the letter *i*. *E* being a little more difficult in the German, he took the brush from the bottle of wormwood and applied that to the tongue and pronounced the letter *e*, and the pupil, when he tasted wormwood, knew that he should pronounce the letter *e*. *A* was indicated by pure water, *e* by sweet water, and *u*, one of the most difficult of vowel sounds, was indicated by sweet oil.

The French reasoned that sight was prior to hearing, the infant saw before it heard—that signs came before speech. Every child

uses signs before he uses words. So, to the child deprived of hearing, his language must be solely one of sight.

Every foreigner landing on a strange shore, learns the meaning of words by signs and through signs communicates with the people among whom he is thrown.

The Germans, they said, teach words, but teach them mechanically, and the child gets no idea from mere mechanical pronunciation of the word. The one claimed that ideas without words are of little value, the other that words without ideas were worse than useless. The French teachers said that the deaf naturally use signs, therefore let us improve what God has given them and not undertake to improve upon God.

The Abbe De l'Epée invented a system of methodical signs, and attempted to give to this language a development equal to that of speech, with a distinct sign for every spoken word; with peculiar signs to denote grammatical characters. He intended to make this language as comprehensive as the French; if he could only find a nation of deaf-mutes, he would give them this language and they would equal in every respect the French nation.

The first notice I have seen relating to the deaf in England, was given to me by Mr. Langley, of the Smithsonian.

Extract from "*Mercvry or the Secret and Swift Messenger*," (Bishop Wilkins) London, 1641:

> "It were a miserable thing, for a rational soule, to be imprisoned in such a body, as had no way at all to expresse its cogitations; which would be so, in all that are borne deafe, if that which nature denies them, were not in this respect supplied, by a second nature, custome and use.
>
> "But (by the way,) 'tis very observable which *Vallesius relates of Pet. Ponticus* a friend of us, (*sic*) who by an unheard of art taught the deaf to speak. *Docens primum scribere, res ipsas digito indicando, quæ characteribus illis significarentur; deinde ad motus linguæ, qui characteribus responderent provocando.* First learning them to write the name of anything, he should point to; and afterwards provoking them to such motions of the tongue as might answer the several words. 'Tis probable, that this invention, well followed, might be of singular use for those that stand in need of such helps. Though certainly that was far beyond it, (if true) which is related of an ancient Doctor, *Gabriel Neale*, that he could understand any word by the mere motion of the lips, without any utterance."

Sacra Philos. Chap. 3.

Dr. Wallis of England, published a book about 1680, in which he described how the deaf could be taught to speak. He had a number of private scholars but no school.

Some seventy or eighty years later, a gentleman in Leith who had a deaf child showed Dr. Wallis' book to Mr. Braidwood,

an Edinburgh elocutionist, and asked him to teach his son to speak. Mr. Braidwood, an ingenious and accomplished teacher, taught this boy, and also opened a school for the deaf about 1760, in which he had great success. Schools were started in England and for a long time were taught by the members of the Braidwood family, or by the Braidwood method. That method, however, like Heinicke's, of Germany, was kept a secret and has been lost. In 1792, the first public school for the gratuitous education of the deaf was opened in London, of which Dr. Watson, the nephew of Braidwood, was for thirty-seven years the principal. The oral method, which was for many years employed, gradually ceased to be used in many of the schools, the double-handed alphabet being adopted in its place. In some schools signs were used, in a few the oral system with signs or the Manual Alphabet.

About twenty years ago Mr. and Mrs. St. John Ackers of England, had a daughter who lost her hearing when quite young. Wishing to learn the best methods of teaching her they visited many of the schools of Europe and America, and finally selected a teacher from one of our oral schools. Such success attended the education of their daughter that they determined to introduce the oral system into England, and founded a school for the training of teachers. About the same time Mr. Van Praagh started an oral school in London, and since then the oral system has been spreading.

From Germany, France, and England, the instruction of the deaf spread to the other nations of Europe. Improved methods of instruction were devised—the oral method was adopted in some schools, the sign language in others.

In 1880, a National Congress for deaf teachers and others was held at Milan, where the leading schools of the world were represented. After a full discussion, it was resolved that the oral method ought to be preferred for the instruction of the deaf and dumb. The representative of the French government gave a frank avowal of his conversion to the pure oral method, and to-day the oral method is practised in the schools established by the Abbe De l'Epée and the Abbe Sicard in Paris.

The action of the Milan Convention led to new inquiries in Great Britain. A Royal Commission appointed by the Queen made its report in 1889, and recommended that in schools which received government grants, whether conducted on the oral, sign, manual, or combined system, all children should be for the first five years, at

least, instructed in the oral system and taught to speak and read the lips, unless physically or mentally disqualified, in which case the teacher would notify the parents that they should either be removed from the oral department of the school, or taught elsewhere on the normal system in schools recognized by the Educational Department. That children who had partial hearing and the remains of speech, should in all cases be educated on the pure oral system, and that the children should be classified according to their ability. So stands the case in Europe to-day; signs are used much less than formerly, the oral system more and more.

AMERICA.

In 1815, the Rev. Thomas Gallaudet became interested in a little deaf girl at Hartford. On inquiry, he found that there were a large number of deaf children in Connecticut and other parts of the country, who were growing up in ignorance and he determined to devote his life to their instruction. Some friends raised a small sum of money and sent him to England to learn the methods of instruction used abroad. He expected to enter one of the schools in London, where the oral system was in use, but found difficulties in each of his applications. He met the Abbe Sicard, who was then in London with some of his pupils. Mr. Gallaudet was so greatly impressed with the talent of the Abbe and the acquirements of his pupils that he followed him to Paris. Mr. Gallaudet says the difficulties which the narrow monopolizing spirit of the British teachers threw in his way, most providentially, obliged him to have recourse to Sicard, who instructed him in the sign language. He returned to America bringing with him one of the assistants of the Abbe Sicard. Through such an accident the sign language was adopted by Mr. Gallaudet, and introduced into America. The American Asylum at Hartford was established in 1815. It was a great blessing to the deaf, and a beginning once made, other schools rapidly sprang up, and thus the sign language was universally adopted in America.

To Mr. Gallaudet the deaf owe a debt of lasting gratitude. He was their first friend and teacher, and his life was devoted to their welfare. His work has been carried on by his sons with the same earnestness and devotion.

Efforts were made at various times to teach the deaf to speak, with what success will be shown by citations from reports of the American Asylum, one of the best institutions for the deaf in this

or any other country. The third annual report (1819), states that they have abandoned "the comparatively useless attempt to teach their pupils articulation." The report for 1828 says, "all efforts to accomplish it in the Institutions for their instruction are now considered useless; and, even if once made with very sanguine hopes, and high professions of success, are wholly abandoned." The report for 1836 says: "The attempt to teach articulation as a part of the regular system of the Asylum, has never been made, from the firm conviction that it is comparatively a useless branch of the education of the deaf and dumb." Subsequently they determined to make systematic and persistent efforts to teach articulation. Miss Eliza Wadsworth, now Mrs. Noyes, was employed as teacher of articulation. This was the first systematic attempt made in this country to teach the deaf to speak: but after ten years this instruction was given up. In 1857, some instruction in articulation was given. The report for 1866 says: "Articulation is working against nature, it is not possible to restore speech to the deaf and dumb to any considerable or useful degree. The results obtained are unsatisfactory and transient, unless taught by some other method than articulation, three fourths must be left in ignorance. The deaf-mute in losing his hearing has lost the power of speech, and the recovery of the one, and that alone, will in any proper or valuable sense, restore the other."

"The attempt to teach articulation as a part of the regular system of the Asylum, has never been made. Our teaching is consequently by signs. For those who lost their hearing when three or four years old, our efforts were to very little purpose. The great mass of deaf-mutes, comprising more than nine tenths of the whole number, can be satisfactorily taught only by the use in the first instance of their own natural language, or by signs, aptly styled the poetry of motion. Speaking is unnatural and therefore unhealthy." "It has always been admitted that a few children who lost their hearing after having acquired some language, and who were under peculiarly favorable circumstances could be taught by the oral method, but the proportion was so small and the results so unsatisfactory that it was not worth the time and effort required."

"Out of two hundred and twenty-three at the American Asylum, twelve, or five per cent could be so taught beneficially; excepting in these cases, that is to say, in the case of the great majority of the deaf, instruction in mechanical articulation is attended with too little

benefit to compensate for the serious sacrifice made to attempt it." From time to time travelers, particularly Horace Mann and Dr. Howe, brought reports from Europe of the success of articulation teaching in Germany. Instructors from different schools sent to Europe made a careful examination of the systems used abroad, and though they found some cases where the oral method was successful, yet the general impression they derived from examination was unfavorable to the teaching of articulation. The instruction in the German schools, they said, was mechanical; the pupils often used words they did not understand, and the results were not equal to those obtained by signs in the French schools. No changes were made in the methods of instruction. There was at times a strong public sentiment in favor of articulation, the institutions yielded to it for a time, and spasmodic efforts were made to teach articulation. The teachers had little faith in such instruction, and so a short time, in some cases only twenty minutes a day, was given to instruction in articulation, that failure necessarily followed and this instruction was abandoned, to be renewed from time to time. Their efforts ebbed and flowed, now they believed that there was some good in teaching articulation, again they taught only by signs. These efforts were largely dependent on the ability of the teacher, and the interest the principal felt in the success of the oral method.

The French system, the language of signs or pantomime, is undoubtedly not only the natural language of the deaf, but before the deaf child has entered school he has learned signs at home; he brings them to the school; he lives in an atmosphere of signs, and rapidly learns new signs in the school and in the playground. The deaf are generally from the poor and uneducated classes, and only feeble efforts have been made at home for their instruction. Their mental condition is very low, and only those who have taught the deaf can understand the difficulties with which the teacher has to contend.

A few quotations from the reports of the Asylum will illustrate their condition: "The mental capacities of deaf-mutes are equal to those of other children, but it is the universal testimony of teachers that few enter school with any knowledge save that obtained by observation, and that they have no innate ideas, or sense of moral accountability."

In the 22d report of the American Asylum are several questions and answers addressed to a number of pupils whose average age on joining the school was about fourteen. "Before you were instructed

in the Asylum had you any idea of the Creator?" The answers, substantially alike, are given by thirteen pupils. "No, I did not know that a Creator existed." "I had no idea of God at all before I entered the Asylum." "Had you reasoned or thought about the world or the beings and things it contains?" "I never attempted to suppose who had made the world, nor how it had ever come into existence." "Had you any idea of your own soul?" "I never conceived such a thing as a soul, nor was I ever conscious that my mind had faculties and operations different and distinct from those of my body."

Their answers show how little their friends at home had been able to teach them.

While the advantages of the natural language of signs in the early mental development of the pupils are very great, yet we must recognize its limits. It is a low order of language, "almost entirely destitute of pronouns, conjunctions, adverbs, and the moods and tenses of verbs. These must be taught them and the difficulty of the task can be more easily conceived than described." (6th Rep. Am. Asy.) "They are always foreigners among their own kindred and neighbors, nay, more than foreigners, for our speech," is "absolutely for them unattainable." (43d Rep. N. Y. Inst.) Says Prof. Day: "The great mass of even the most promising pupils think mainly, I am satisfied, in pantomimic signs." Greater mental development may have been obtained by the sign language than by the mechanical articulation formerly taught in the German schools. But the object of instruction is not only to communicate ideas but to teach the English language, and fit the pupil to enter into the life of his fellows. This is a generation of progress; great improvements have been made in the methods of instruction both of the deaf and of the hearing child.

General Garfield told me some years ago that when he was appointed President of the College at Mentor, Ohio, about 1858, he examined its curriculum of education and was surprised to find how much of the dead and how little of the living there was in it. He compared it with the curriculum of Harvard, Yale and other colleges in America, and found they were nearly alike. He examined the curriculum of Oxford and Cambridge for many generations, and found that the same studies had continued in use in the universities for nearly four hundred years; no progress, little improvement, "a cast-iron thing as one of our members calls it, inherited from the dark ages." I will refer to one other witness. Horace Mann in his

second report to the Board of Education of Massachusetts, writes of the character of the instruction in the Massachusetts schools of fifty years ago. and says: "Out of all the pupils in the common day schools, eleven twelfths were unable to comprehend what they read in their reading books or learned in their study books;" and if in Massachusetts the teaching was so mechanical, how much more so must have been the instruction of the deaf.

In 1864, a petition was presented to the Massachusetts Legislature for a charter for a school, where the deaf could be taught by the oral method. That application was referred to the Committee on Education, and Dr. Howe appeared with me in behalf of the petition. The chairman of that committee, Mr. Dudley, reported adversely, and said he had a congenitally deaf-mute child at Hartford who could be taught only by signs; that the instruction of the deaf by articulation was a theory of visionary enthusiasts, which had been repeatedly tried and abandoned as impracticable.

In June 1866, a small oral school was opened at Chelmsford, Massachusetts. The principal, Miss Rogers, began with the manual alphabet and oral system, but a brief trial of this combined system convinced her of the impossibility of obtaining complete success while using both methods. She therefore abandoned the manual alphabet and retained only articulation and lip-reading. The results exceeded her expectations. Her little school became a great success.

In 1867, the gentlemen interested in the Chelmsford school waited upon the Governor of Massachusetts to secure his aid for the incorporation of the school, and were then informed by him, that Mr. Clarke of Northampton was willing to give $50,000 towards the establishment of a school for the deaf in Massachusetts. A large special committee of the Legislature was appointed who held several sessions, at which the teachers and trustees of the American Asylum were present, in opposition to our plan. Dr. Howe, Mr. Sanborn and myself favored it. Our little pupils from Chelmsford were present. At one of the hearings my daughter was called before the committee and questioned in arithmetic, and history geography. Her answers were satisfactory. To test her general intelligence a gentleman asked, "Can you tell me who laid the first Atlantic cable?" Quickly and smilingly she answered, "Cyrus Field." The committee was convinced that her progress and intelligence were equal to that of most hearing children of the same age. At one of these hearings, our little girl saw for the first time the deaf-mute signs, and asked why the deaf-mutes did not speak with the lips as she did, for she thought it a good deal better to talk with the mouth than with the fingers.

Mr. Dudley, who was again a member of the Legislature and of the special committee, became convinced of the superiority of the oral method and it was largely through his efforts, that our petition was granted. The Clarke Institution was started with the generous gift of $50,000 from Mr. Clarke, subsequently increased by him to $300,000. The school was visited by teachers from all parts of the country, some approved, others doubted, some thought articulation a blessing, others regretted that we did not use the beautiful language of signs; but from that time, the oral method has been in successful operation in the United States. Oral schools were started in different States. Day schools were established in Boston and other large cities. Instruction in articulation was introduced to a greater or less extent into most of the institutions where the sign language alone had been used. More and more attention has been paid to the use of the Manual Alphabet, and the English language and better results obtained in all the schools.

In 1886, the Eleventh Convention of the American Instructors of the Deaf was held in California, and the following resolution was passed:—

Resolved, That earnest and persistent endeavors should be made in every school for the deaf, to teach every pupil to speak and read from the lips, and that such efforts should be abandoned only when it is plainly evident that the measure of success attained does not justify the necessary amount of labor.

Since Dr. Mann's report to the Board of Education, great changes have been made in the education of hearing children, and as great in the instruction of the deaf. These improvements have benefited the deaf more than any other class, because of the greater difficulty in instructing them and their entire ignorance when first brought to the school. In 1867, all the schools were taught by signs, now there are three classes. In the first class, taught by signs, there are thirteen schools. In the second class, taught by the oral method, there are fourteen schools. In the third class, where the oral system and signs are used, called the combined method, there are fifty-two schools.

We have already seen the feeling and action of the American Asylum. How great change is apparent if we contrast the report of 1867 with that of 1890. It describes two sub-divisions in the combined schools: (*a*) Those giving all the pupils the power to acquire articulation and lip-reading, without sacrificing development in other directions. (*b*) Those who select certain pupils for such instruction. The American Asylum belongs to the division *a*,

which gives to all pupils an opportunity of acquiring articulation. "We hold that direct and earnest efforts should be made by expert teachers of those branches to teach speech and speech-reading to every pupil, and in no case should that effort be abandoned until those teachers are convinced that the pupil will never acquire enough of speech to be of any practical use."

I will make one quotation from the report for 1891, of the Pennsylvania School: "For fifty years prior to 1870, the system of instruction was the sign, or manual alphabet system. No other method was practised, no other method was believed possible."

In 1868 a class under oral instruction was commenced in the Illinois Institute. The Institution at Philadelphia followed the example set by Illinois in 1870, and later New York and Hartford established classes in articulation. The work was conducted in this way in Philadelphia until 1881, but with little success, when an important change was effected and an oral department established.

"In 1885, additional accommodations were provided and the oral school now numbers one hundred pupils." Mr. Crouter, its principal, says: "The time for doubt has gone, and gone forever. Speech, God-given speech, is the heritage of every child, and every child should be afforded the opportunity to acquire it. Teaching it under the combined system is a good way, if no other can be provided; teaching it, and by itself in separate classes, where all the conditions are most favorable, is in my judgment, the best way." The principal in this school only a short time ago said that he would gladly give up all other methods and adopt the oral system alone, if it were not for the prejudices of the parents of some of his pupils.

Very different is the opinion of another of our most eminent teachers of the deaf. In a recent paper he says: "The education of all the deaf cannot be effected by the exclusive practice of the pure oral method, and to its unwarranted, not to say arrogant demand for complete supremacy; the reply may justly be, "Mene, mene, tekel upharsin!"

Perhaps the chief reason for the great difference of opinion between these two gentlemen is, that the first has faithfully used the oral method and satisfied with its success appreciates its value, while the other, insensibly influenced by the memory of his father's work, and by many years of successful teaching of the sign language, has never given the oral system a thorough trial.

Judging from experience, I am neither unwarranted nor arrogant in asserting that all deaf children of ordinary mental ability can be taught to speak and to read from the lips, and will give the reason for this belief by a statement of what has been accomplished since the introduction of the oral method of teaching in 1867.

There was not at that time a single teacher of articulation in any of our schools, now more than half of the whole number are articulation teachers.

The number taught articulation is rapidly increasing. In 1865 none, in 1884 only twenty-seven per cent, in 1891, forty-six per cent or nearly one half. Ninety-five per cent of the pupils applying for admission to the Clarke Institution are taught by the oral method. A careful examination of the statistics of that institution shows the whole number of pupils from 1867 to 1891 to have been 367, of these nineteen have left, probably because the principal thought they could be taught better in the sign schools. This is a little over five per cent. The principal further says that the number leaving on this account is steadily decreasing.*

In addition to these facts and largely in consequence of the great interest aroused in the education of the deaf, there has been a large increase in the number under instruction. In 1867, only 2,000 deaf were attending school, now there are 9,200, an increase four times greater than the increase in our population in the same time. The time of instruction has been extended in many schools from from six to twelve years, or one hundred per cent.. Then forty-one per cent of the teachers themselves were deaf, now less than twenty-five per cent are deaf. We admit that the articulation of the deaf is always imperfect, the voice never properly modulated. This must ever be the case without the ear to guide and direct. Imperfect as it must be, it is far better than the sign language, for friends easily become accustomed to its imperfections, and understand it, while the deaf learn to read the lips with which they are familiar. Even to strangers their articulation is more intelligible than signs. Besides which, the deaf are taught to use the English

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* The whole number of pupils from 1867-91 367
(a) Number transferred to combined system schools on account of system..... 10
(b) Number transferred to combined system schools on account of blindness..... 2
(c) Number transferred to combined system schools in hope of results..... 1
(d) Number expelled from school..... 3
(e) Number left to enter Roman Catholic schools..... 2
(f) Number entered schools nearer home on account of expense..... 10
(g) Reason not apparent on record, transfer probably advised by principal..... 9

language and to read, speak and think in it, which is impossible to one constantly using the language of signs. He is a foreigner in his own land using a language which is not that of the world in which he lives.

If, therefore, it is admitted that the deaf child can be educated to the same extent by the oral method as by the use of signs, he is by so much the gainer over those using the other system.

The friends and teachers of the deaf have only one end in view, —the best way to teach them. There is not a teacher in America, who will not agree with me that speech should be given to the deaf child whenever possible.

Twenty-five years ago I stated to the Legislature of Massachusetts that there were many semi-mutes who had lost their hearing after they had begun to talk, and who retained some language, who could be taught speech and lip-reading, possibly fifty per cent in all. With greater confidence I say now, that when another twenty-five years shall have rolled around, it will be found that not fifty per cent, but that every deaf child of ordinary mental ability, will be taught to speak intelligibly and read from the lips and thus be restored and fitted to enter into the work of his country.

THE PRESIDENT: I will mention to the Association a rather remarkable occurrence. At the very moment when Mr. Hubbard was telling us about the organization of the Chelmsford school by Miss Harriet B. Rogers, a telegram was placed in my hand from Miss Rogers herself. She regrets her absence from this assembly and sends heartiest congratulations on the success of the meeting.

Our next lecture will be by Dr. Hewson on the anatomy of the pharynx, mouth and nasal passages,

ANATOMY OF THE PHARYNX AND MOUTH.

FRIDAY, JULY 3d.—10 A. M.

DR. HEWSON: Having now finished the description of the larnyx, I must call your attention to the parts above, namely, the pharynx, the tongue and the mouth, together with such parts of the nasal cavity as take part in the production of sound. The pharynx consists of a musculo-membranous bag, extending from the base of the skull to the lower border of the cricoid cartilage in front and the fifth cervical vertebra behind. It is about four and one half inches or 11 cm. 4 mm, long, and broadest from side to side, its greatest breadth being comprised between the greater cornu of the hyoid bone. It is bounded above by the petrous or basi-cranial portion of the temporal bone and by the under surface of the body of the sphenoid. It is continuous below with the œsophagus (Fig. 21, No. 5), and is connected behind by loose oreolar tissue to the cervical vertebræ (Figure 22), the longus colli and the rectus capitis antici muscles. In front it is attached from above downward to the internal pterygoid plate of the sphenoid bone to the pterygo-maxillary ligament (which extends from the hamular process of the internal pterygoid plate to the foramen on the inner surface of the ramus of the lower jaw), to the lower jaw at the attachment of the above mentioned ligament (Figure 23), to the base of the tongue, to the cornu of the hyoid bone and the stylo-hyoid ligament and to the thyroid and the cricoid cartilages. Laterally it is in relation with the styloid process (Figure 24), the styloid and pterygoid muscles, the internal cartoid artery, the internal jugular vein, the glosso-pharyngeal, pneumogastric, spinal accessory, hyo-glossal and sympathetic nerves, and also below that the lateral lobes of the thyroid gland,

common carotid artery, sterno-hyoid muscle, and in front with the hyo-glossus muscle and the lingual artery and nerve. It presents seven openings: The two posterior nares above and in front (Figure 25), the Eustachian tubes above and at the sides (Figure 22), the mouth in the middle line in front (Figure 25), the larynx in the middle line in front and more towards its lower part (Figure 25), and terminating below in the œsophagus. (Figure 25.) The structure of the pharynx presents for consideration three coats, which from without inward are the muscular, the fibrous and the mucous, together with the vessels and nerves which belong to them.

Fig. 21.

POSTERIOR VIEW OF THE PHARYNX ATTACHED TO BASE OF THE SKULL ABOVE. 1. Inferior constrictor muscle. 2. Middle constrictor muscle. 3. Superior constrictor muscle. 4. Tensor and levator palati muscles at their origin. 5. Æsophagus or food passage. 6. Trachea. [From Potter's Quiz Compend of Anatomy.]

THE MUSCULAR COAT

is formed of six muscles: The superior, the middle and the inferior constrictors, stylo-pharyngeus, palato-pharyngeus, and the salpingo-pharyngeus, or muscle Santorini.

THE SUPERIOR CONSTRICTOR

(Figure 21, No. 3), arises from the lower third of the free margin of the internal pterygoid plate at its hamular process, and the tuberosity, from the pterygo-maxillary ligament (Figure 23), from the alveolar process of the inferior maxillary bone above the myloid ridge and from the side of the tongue. It is inserted into the median raphé on the posterior middle line of the pharynx (Figure 21), its superior fibres ascending by means of a strong, fibrous band, presently to be mentioned, to the pharyngeal spine on the basilar process of the occipital bone (at the base of the skull), its lower fibres being horizontal. It is supplied by the pharyngeal plexus of nerves.

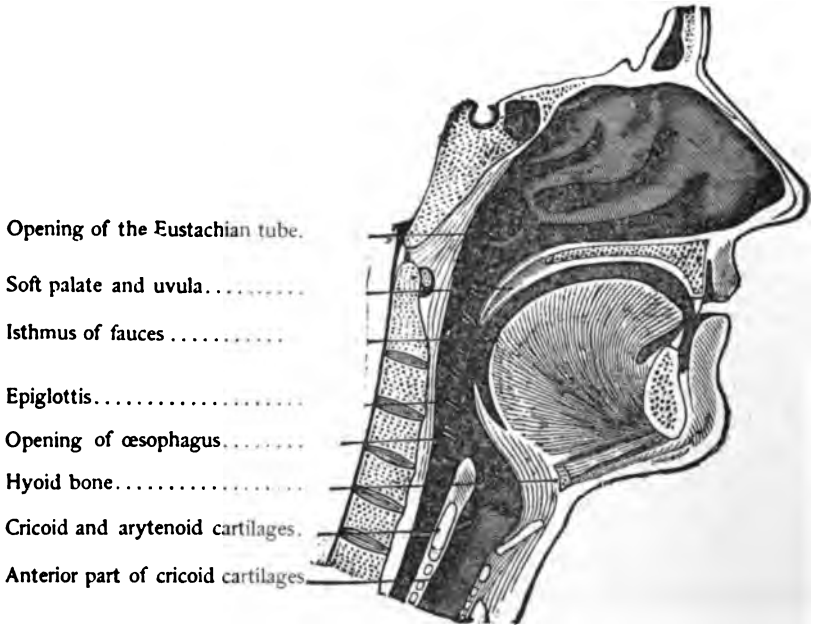


Fig. 22.

VERTICAL SAGITTAL SECTION OF CAVITIES OF THE NOSE, MOUTH, PHARYNX, AND LARYNX.

THE MIDDLE CONSTRICTOR

(Figure 21, No. 2,) arises from the whole extent of the upper surface of the greater cornu of the hyoid bone (Figure 23), the lesser cornu and the stylo-hyoid ligament, and is inserted on the posterior median line of the pharynx, its inferior fibres descending beneath the inferior constrictor, its middle fibres being horizontal, and its superior fibres overlapping the superior constrictor and the stylo-pharyngeus muscles (Figure 24). It is supplied by the pharyngeal plexus of nerves.

THE INFERIOR CONSTRICTOR

(Figure 21, No. 1), arises from the side of the cricoid cartilage, from the oblique line on the outer surface of the alae of the thyroid cartilage and the surface behind it and the inferior cornu. (Figure 23.) It is inserted into the raphé on the posterior median line of the pharynx, its inferior fibres being horizontal and continuous with those of the œsophagus, its superior fibres passing obliquely upward and overlapping those of the middle constrictor. It is supplied by the pharyngeal plexus and the external and recurrent laryngeal nerves.

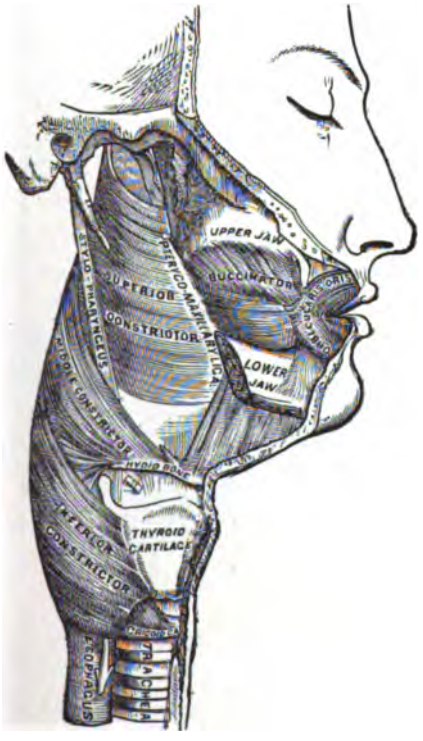


Fig. 23.

POSTERIO-LABIAL VIEW OF PHARYNX AND MOUTH. Portion of the lower jaw bone having been removed.

THE STYLO-PHARYNGEUS

(Figure 24), arises from the inner side of the base of the styloid process and is inserted with the palato-pharyngeus (Figure 25), into the posterior border of the thyroid cartilage and side of the pharynx. It is supplied by the pharyngeal plexus of nerves, and the glosso-pharyngeal nerve.

THE PALATO-PHARYNGEUS

(Figure 25), arises from the posterior surface of the palate by two heads, separated by the levator palati muscle, and is inserted with the stylo-pharyngeus into the posterior border of the thyroid cartilage and the side of the pharynx. It is supplied by the pharyngeal plexus of nerves.

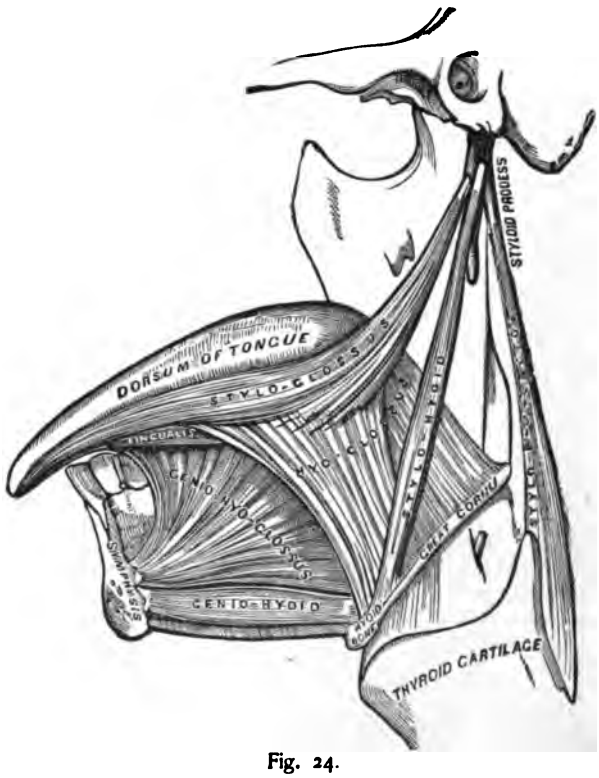


Fig. 24.

LABIAL VIEW OF THE MUSCLES OF THE TONGUE AND THEIR ATTACHMENT TO THE NEIGHBORING BONES.

THE SALPINGO-PHARYNGEUS,

or muscle Santorini, is a small fasciculus from the outer surface of the cartilaginous portion of the Eustachian tube, to the stylo-pharyngeus, with which it blends inferiorly. It is often wanting.

RELATIONS OF THE MUSCLES.

The constrictors overlap each other from below upward. The stylo-pharyngeus passes between the superior and the middle constrictors; the superior laryngeal nerve between the middle and inferior constrictors; the recurrent laryngeal nerve beneath the inferior constrictor.

THE FIBROUS COAT,

or pharyngeal aponeurosis, is thick above, thin below, attached to the petrous portion of the temporal bone, the under surface of the body of the sphenoid, and by means of a strong fibrous band to the pharyngeal spine on the under surface of the basilar process.

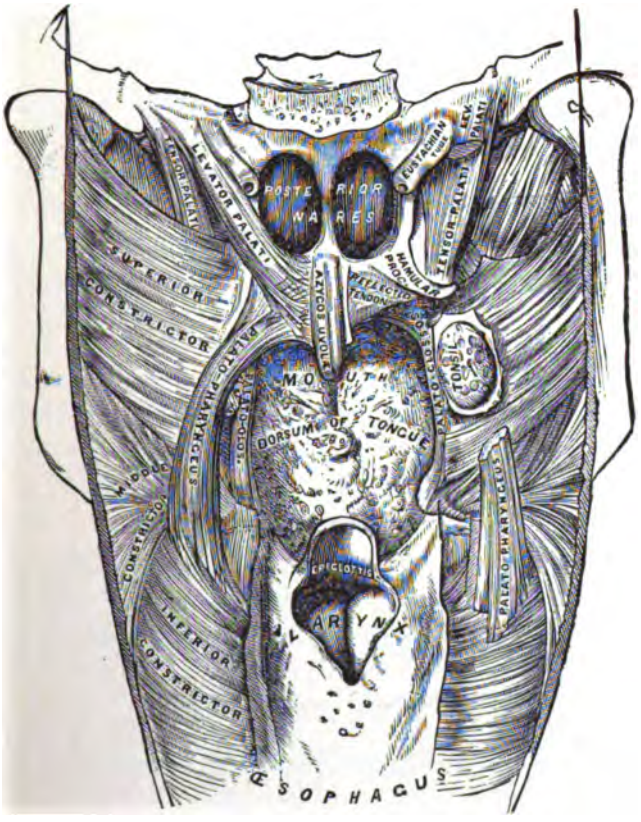


Fig. 25.

PHARYNX OPENED FROM BEHIND SHOWING THE ATTACHMENTS OF THE VARIOUS MUSCLES.

THE MUCOUS MEMBRANE.

The mucous membrane is thick on the under surface of the body of the sphenoid, covered with columnar ciliated epithelium as low down as the floor of the nares, with squamous epithelium below. Beneath it are numerous fine glands, which are simple and compound, follicular and racemose.

FUNCTION OF THE PHARYNX.

In the passage of the food from the mouth to the œsophagus, the action of the muscles of the pharynx is to

contract one upon another, and thus drive the bolus of food from above downward. This is of course assisted by gravity. The muscular action of the pharynx is so great that it can close completely its passage. Its function in relation to speech is possibly to act as a resonating cavity by the movements of the constrictors. By the action of the superior constrictor the upper portion of the pharynx is contracted, the posterior wall is advanced to meet the soft palate, and thus the voice is thrown into the buccal cavity. This action can be very easily studied in cases of cleft palate, because the movements of the superior constrictor of the pharynx would be otherwise hid from view. This can be so well seen in those suffering with congenital cleft palate, that there is formed at the upper part of the superior constrictor of the pharynx a ridge, or roll, so to speak, of muscular tissue, which when this portion of the muscle is thrown into action, will bring the upper part of the pharynx in contact with the remainder of the cleft uvula and posterior half arches. By this action of the superior part of the pharynx, assisted by the action of the palate presently to be mentioned, it will be observed that the nasal cavity can be shut off completely from the buccal cavity.

THE SOFT PALATE.

The soft palate (Figures 22, 25), is a musculo-membranous fold which forms an incomplete septum between the mouth and the pharynx, and presents an anterior surface, a posterior surface, an upper border and a lower border.

THE ANTERIOR SURFACE

is concave and presents a median raphé continuous with that of the hard palate.

THE POSTERIOR SURFACE

is convex, continuous with the floor of the nasal fossa, and presents the median projection of the azygos uvulæ muscle. (Figure 25.)

THE UPPER BORDER

is attached to the posterior part of the hard palate.

THE LOWER BORDER

is free, and presents the uvula, the anterior and posterior pillars, which latter embrace the tonsil.

THE ANTERIOR PILLARS

(Figure 25), pass downward and forward to the sides of the base of the tongue, containing the palato-glossi muscles.

THE POSTERIOR PILLARS

(Figure 25), pass downward and backward to the sides of the pharynx, containing the palato-pharyngei muscles, and are rather broader and approach nearer to each other than the anterior pillars. The isthmus (Figure 22), of the fauces is the space bounded by the free border and pillars of the soft palate, the tonsil and the base of the tongue.

STRUCTURE OF THE PALATE.

The palate presents for examination an aponeurosis, muscles, mucous membrane, vessels and nerves.

THE APONEUROSIS

is blended with the tendon of the tensor palati. It is thickest above where it is attached to the posterior border of the hard palate.

THE MUSCLES

are five in number: The levator palati, the tensor palati, the palato-glossus, the palato-pharyngeus, and the azygos uvulæ.

THE LEVATOR PALATI

(Figure 25), arises from the under surface of the apex of the petrous portion of the temporal bone, and the outer aspect of the cartilaginous portion of the Eustachian tube, and is inserted into the posterior surface of the soft palate between the two heads of origin of the palato-pharyngeus. It is supplied by the posterior or small palatine branch of Meckel's ganglion. Its action is to elevate the palate and at the same time to draw it posteriorly. This is done by the oblique direction of the muscular fibre from its origin to its insertion, as the origin is above, behind, and to the outside of its insertion.

THE TENSOR-PALATI

(Figure 25), arises from the scaphoid fossa at the base of the internal pterygoid, and from the anterior aspect of the cartilaginous portion of the Eustachian tube. The muscle winds around the hamular process of the internal pterygoid plate of the sphenoid bone, and expands upon the anterior surface of the aponeurosis of the soft palate, joining in the middle line its fellow of the opposite side. It is supplied by a branch from the otic ganglion. Its action is to tense the palate.

THE PALATO-GLOSSUS

(Figure 25), arises from the anterior surface of the soft palate, and is inserted into the posterior surface and the sides of the tongue

where it blends with the stylo-glossus muscle. It is supplied by nerve filaments from Meckel's ganglion. Its action, the tongue being the fixing point, is to bring the soft palate down to the base of the tongue; the palate being fixed, its function is to raise the sides of the tongue to the palate.

THE PALATO-PHARYNGEUS

(Figure 25), arises from the posterior surface of the soft palate by two heads, separated by the levator palati, and is inserted into the posterior border of thyroid cartilage and the sides of the pharynx, as has been already mentioned. Its nervous supply is from filaments of Meckel's ganglion, and its action, the pharynx being the fixing point, is to bring the soft palate down to the base of the tongue and assist the palato-glossus. The palate, however, being the fixing point, its action is to help to raise the side of the pharynx. These two muscles, the palato-glossus and the palato-pharyngeus are considered to be the constrictors of the isthmus of fauces. Between the two we find lodged the tonsil, or amygdala.

THE AZYGOS UVULÆ

(Figure 25), arises from the posterior nasal spine of the palate bone and aponeurosis of the soft palate, and forms the pendulous portion of the palate known as the uvula. By the contraction of this azygos uvulæ muscle, the space is increased between the upper part of the pharynx and the floor of the nose. This muscle is supplied by the posterior or small palatine branch of Meckel's ganglion.

THE ARTERIES

are the inferior or ascending palatine, the posterior or descending palatine, the ascending pharyngeal, and the tonsillar. The veins join the tonsillar and the pterygoid plexuses. The lymphatic glands communicate with those beneath the angle of the jaws.

THE MUCOUS MEMBRANE.

The mucous membrane is thin, covered with a squamous epithelium except near the Eustachian tube where the epithelium is of the columnar, ciliated variety. Numerous mucous glands are found beneath it except over the posterior surface of the uvula, in which latter situation they form a continuous layer.

THE VELUM PALATI,

Or soft palate, as it is called, is a muscular curtain, the attachments of which I have already given you to the bony palate, and hangs down as a partition between the buccal and the nasal cavities. It

has a double-arched boundary, or support, with the uvula dropping down in the centre. It is composed, you will observe, of muscular tissue, and is overlaid by mucous membrane. It acts as a valve or switch between the buccal and the nasal cavities. It can be placed in juxtaposition to the superior constrictor of the pharynx by the action, as already described, of the contraction of the superior constrictor, the tensing of the levator palati and the tensing of the tensor palati muscles. Thus, by such action it prevents any sound from passing into the nasal cavity. Again, if the tensor and the levator palati muscles are not brought into action, the space between the margins of this soft palate and the superior constrictor of the pharynx will allow a certain amount of sound to pass into the nasal cavity, thus allowing the sound not only to pass through the nose, but also to pass through the buccal cavity. As this portion of the anatomy of the body is so essential to the proper mechanism of speech, and to the clearness and fullness of the sounds which are so readily influenced by its action, I may be pardoned in speaking of the action of the body which is immediately below the soft palate, namely the tonsil.

THE TONSIL

is a flattened, oval body, which occupies the space at the side of the fauces between the palato-glossus muscle in front, forming the anterior pillar, and the palato-glossus muscle behind, forming the posterior pillar of the palate. It is of variable size, and often as the result of the disease which causes more or less enlargement, but normally it is about two thirds of an inch or 17 mm. long, scarcely half an inch or 8 mm. broad, and less than half an inch or 8 mm. in thickness. Its greatest diameter is vertical, with its free portion looking into the interior of the fauces toward the middle line. Its outer surface is in contact with the superior constrictor of the pharynx, to which it is attached by connective tissue. If you look at its inner surface you will observe numerous small openings which look like the pits in a honey-comb, which are of various size and may open into larger or smaller ones. These crypts are lined with mucous membrane, and occasionally you will find in some of these crypts a small, nodular mass of lymphoid tissue. The tonsil bears a very important relation to the internal carotid artery, which is very close to it, having only interposed between the artery and the gland itself, the superior constrictor of the pharynx. The arterial supply of the tonsil is similar to that of the tongue. It is also supplied by

the inferior palatine, tonsillar, branches from the tonsillar and the superior palatine branches of the internal maxillary artery. The lymphatics are very abundant and communicate with the deep cervical lymphatics which join the deep cervical glands, which I have no doubt many of you have noticed among the children under your care when you found an enlarged tonsil, because you will readily feel hard masses immediately behind the angle of the lower jaw when the tonsil is enlarged. The relation that this tonsil bears to the production of sound is important from the fact that any enlargement of this gland interferes with the action of the palato-glossus and the palato-pharyngeus muscles, as well as interfering with the action of the levator palati and tensor palati muscles. Take first those muscles which are above, supposing that the tonsil is enlarged and it is requisite to close the opening between the pharynx and the nasal cavity. The muscles, I have already told you of, which perform this function are the levator palati and the tensor palati muscles. Now if these muscles are brought into action with an enlarged tonsil, you will observe that they will have to contract much more than they would in the normal condition in order to close up that opening. Again, supposing the tonsil is enlarged and we wish to observe the action of the palato-glossus and the palato-pharyngeus muscles. Any action that these muscles may take with a view to allowing the sound to pass through the mouth, would of course, be *nil*, because they have nothing whatever to do with allowing the sound to be passed through the mouth. The tonsil, then, when enlarged impedes not only the action of the tensor and levator palati muscles, but also interferes with the passage of the sound through the mouth by reason of the projecting free margin of this gland in the isthmus of the fauces.

THE CAVITY OF THE MOUTH.

The bony walls of the mouth consist of the parts above, namely, the palate process of the superior maxillary bone, and the palate processes of the palate bones. The bony walls at the side are made up of the alveolar processes of the upper and lower jaws and the inner surface of the maxillary. The floor of the mouth is entirely muscular.

Properly speaking, the ceiling of the mouth includes the hard and soft palate, making the cavity of the mouth proper and a vestibule, or that space which is between the inner margin of the lips and the outer margin of the teeth and the alveolar processes which

make the gums. (Figure 22.) The inner cavity, or cavity of the mouth proper, contains the tongue. The lips make the entrance of the mouth and their union at the sides forms its angles or corners. The cheeks, which form the flexible lateral boundaries of the mouth together with the teeth and the alveolar processes of the upper and lower jaws, are composed of muscles (Figure 23), (the buccinator muscle), lined on the inside by a mucous membrane. That which forms the inner boundary of the vestibule of the mouth consists of the alveolar borders of the jaws supporting the teeth. These borders are thickly covered by a dense membrane covering the bone naturally, and upon this the mucous membrane which lines the vestibule and the mouth, forming what is known as the gums.

THE HARD PALATE

(Figure 22), is included between the arches of the upper jaw bone, and these acting as a base, the palate arches from one side to the other. It is deeply vaulted in the young and in the female, but not so arched or vaulted in old age, consequent upon the loss of the teeth and the absorption of the alveolar processes in which they are lodged. It is covered by a very dense periosteum, and this is again covered by a thick, mucous membrane which has a number of glands in it. This mucous membrane is thrown into a number of folds arranged transversely close up to the front teeth, or incisor teeth, but which as it approaches the soft palate becomes smooth. There is a semblance of a median ridge, or raphé, ending in the papillæ beneath the incisive foramen.

THE SOFT PALATE

(Figure 22), the foundations of which have already been described to you, consists of a movable flap which extends from the posterior part of the hard palate obliquely downward and backward from between the mouth and the nose and into the pharynx. The lower surface is concave and smooth, and is divided in the middle line by a continuation of the median raphé. The upper surface is convex and somewhat more prominent along the middle, and the posterior surface is free, prolonged in the middle line by the uvula, as I have already described.

THE FLOOR OF THE MOUTH

(Figures 22, 24, 16), is that space included between the arch of the inferior maxillary bone at its lower border, the mylo-hyoideus muscle (Figure 16, No. 5), at the sides, the genio-hyoideus muscle

and the anterior belly of the digastric in front, together with the intrinsic muscles of the tongue which are found at its base; in other words, between the lower border of the inferior maxillary bone and the upper part of the greater cornu of the hyoid bone and its body. It contains

THE TONGUE

(Figure 24), which presents for examination a base, an apex, an upper surface, an under surface and a structure of its own.

THE BASE

is connected to the soft palate by the anterior pillars, or the palato-glossus muscle, covered by mucous membrane; with the pharynx by the superior constrictor of the pharynx and the mucous membrane; with the œsophagus by the three folds of mucous membrane forming the glosso-epiglottidean ligaments; with the hyoid or tongue bone, by the hyo-glossus, and the genio-hyo-glossus muscles.

THE APEX

is free.

THE UPPER SURFACE

is rough in its anterior two thirds, where it presents a number of papillæ of three different sizes, which are known as the papillæ minimæ, the papillæ mediæ, or fungiformaes; and its posterior third, or behind, the papillæ maximæ or circumvallate, below which it presents the projecting orifices of numerous mucous glands.

THE UNDER SURFACE

is connected with the hyoid bone and lower jaw, by the genio-hyo-glossus and the genio-hyoid muscles, and from the sides of which the mucous membrane is reflected over the floor of the mouth to the inner surface of the gums, forming in front a prominent fold which is called the frænum.

THE STRUCTURE OF THE TONGUE

presents for examination an osseo-fibrous support, muscular fibres, mucous membrane and the vessels and nerves.

THE OSSEO-FIBROUS SUPPORT

consists of the *hyoid bone*, the *median fibrous septum* (which is thickest behind where it is attached to the epiglottis). The *hyo-glossal membrane* connects the under surface of the tongue with the hyoid bone, to which can be added the *thickened mucous membrane* on the back part of the tongue.

THE MUSCULAR FIBRES

may be divided into two sets; those which are intrinsic and those which are extrinsic.

THE INTRINSIC MUSCLES

are the transverse lingual, the superior lingual, the inferior lingual and the perpendicular lingual.

THE TRANSVERSE LINGUAL

arises from the median septum and is inserted into the sides and dorsum of the tongue. It forms the chief bulk of the tongue, and its action is, by drawing the tongue together, to protrude it between the lips.

THE SUPERIOR LINGUAL

is a stratum of longitudinal, or slightly oblique fibres, thickest in front, covering the dorsum of the tongue beneath the mucous membrane to which its fibres are attached. Its action during contraction is to draw the tongue into the mouth; in other words, to broaden the tongue.

THE INFERIOR LINGUAL

is a longitudinal band of fibres which runs the whole length of the under surface of the tongue, between the hyo-glossus and the genio-hyo-glossus muscles, and blends in front with the hyo-glossus muscle. Its action is similar to that of the superior lingual.

THE PERPENDICULAR LINGUAL

is a set of vertical, or slightly oblique fibres which pass from the central portion of the dorsum of the tongue to the sides of the under surface, forming curves, concave outward and upward. The action of this muscle is to increase the thickness of the tongue in the middle line, and as this portion, particularly that situated at the back part of the base of the tongue, is so frequently brought into contact with the central portion of the hard and soft palate in the production of sound, you can readily see the utility of learning the position and action of these little muscles in the tongue itself. The outer portion of the tongue is hard and firm, and consists mainly of the longitudinal fibres already alluded to. The central portion is softer and consists mainly of transverse and vertical fibres mixed with adipose tissue.

THE EXTRINSIC MUSCLES OF THE TONGUE

are the stylo-glossus, the hyo-glossus, the genio-hyo-glossus and the palato-glossus.

THE STYLO-GLOSSUS

(Figure 24), arises from the anterior and outer aspect of the styloid process near its apex and the stylo-maxillary ligament, and is inserted into the side of the base of the tongue external to the hyo-glossus, dividing into a longitudinal portion which passes forward along the side of the tongue, and blends with the inferior lingual in front of the hyo-glossus and a posterior portion which decussates with the hyo-glossus and with its fellow of the opposite side. Acting singly, it draws the tongue laterally; acting on both sides, it draws the tongue backwards; the transverse portion helping to close up the upper part of the pharynx thus decreasing the size of the aperture between the pharynx and the posterior part at the base of the tongue. The longitudinal portion at the side of the tongue will assist in bringing that portion upward towards the palate, which is so necessary in the production of the sounds of *a* and *e*.

THE HYO-GLOSSUS

(Fig. 24), arises from the side of the body, the lesser cornu and the whole length of the greater cornu of the hyoid bone (sometimes called the baseo-glossus or kerato-glossus), and is inserted into the side of the under surface of the tongue between the stylo-glossus and the inferior lingual. Its action is to depress the tongue and thereby enable the inferior lingual and the superior lingual to contract and elevate the tip of the tongue in the cavity of the mouth, as is so necessary in the production of the sound of *r*.

THE GENIO-HYO-GLOSSUS

(Figure 24), arises by a short tendon from the superior genial tubercle on the inner surface of the body of the jaw bone close to its symphisis, and is inserted into the whole length of the under surface of the tongue internal to the inferior lingual, to the side of the pharynx and to the body of the hyoid bone. Its action is to depress and at the same time to protrude the tongue.

THE PALATO-GLOSSUS

(Figure 25), has already been alluded to. Its action, when acting with its fellow of the opposite side, is to constrict the opening of the fauces.

I would refer you to Kingsley's Aural Deformities, Part 4, for further illustration of the mechanism of speech.

The function performed by

in their relation to the upper and the lower jaws, but particularly in relation to the upper jaw, is by adding an arch or the pillars to the arch formed by the palate processes of the superior maxillary and the palate bones, which, when the soft palate is in place, can be made to act as a distinct sounding-board in connection with the pharynx, so that a sound made in the larynx may be transmitted directly through this bucco-pharyngeal cavity to the outer air. But as it is necessary to make certain changes in the sound which may have been made in the larynx, the tongue is so placed in this buccal cavity as to act either as an obstructor or as a vibrator, or as a constrictor to this buccal cavity. All of these functions, you can readily observe, can be performed by this facile organ, so that we can have the tongue placed against the ceiling of the mouth or palate by the contraction of the transverse portion of the lingualis; we can have the sides of the tongue elevated by the palato-glossus and the stylo-glossus; we can have the tip of the tongue turned up by the superior lingual muscle, while the sides of the tongue have been held in place to the ceiling of the mouth, and the tip of the tongue made to vibrate as in the production of the letter *r;* we can have the tongue placed in contact with the back part of the teeth and the alveolar process by the combined action of the intrinsic and the extrinsic muscles of the tongue, namely, by the contraction of the genio-glossus and the upper part of the genio-hyo-glossus muscles, together with the contraction of the transverse portion of the lingualis, as in the production of the *t* sound. I might illustrate the production of several other letters, but these will suffice.

THE NERVES

are the gustatory or nerve of taste to the anterior two thirds and side of the mucous membrane of the tongue. The glosso-pharyngeal nerve to the mucous membrane of the posterior two thirds and base of the tongue. The hyo-glossus is the nerve of motion to the tongue. (The fact of mentioning the arteries and veins and lymphatics will have no practical bearing on the subject, so they will be omitted.)

Let us look now to the mechanism played by the nasal cavity in the production of sound; and in order that you may understand this nasal cavity the better, it is right that I should describe it in part at least.

THE NASAL CAVITY

consists of that part of the upper air passages which is included between the nose in front and the openings behind into the pharynx by the posterior nares. It performs the dual function of transmitting certain sounds from the pharynx, and also the cavity through which the inspired and expired air passes. The nasal cavities (for there are two in number) are two capacious air chambers occupying the middle of the skull between the orbits, which are completely separated from each other by a partition which forms the inner wall of each cavity. The outer wall presents three turbinated or curved processes of bone (Figure 22), separated from one another and from the floor of the cavity, making what is termed three spaces, or meatuses. The roof of each cavity is separated from the cavity of the skull, and the floor is separated from the cavity of the mouth. Each nasal cavity communicates above with the cavity in the frontal bone, the ethmoid bone, the body of the sphenoid and the maxillary bone, which cavities in these individual bones are called sinuses, or spaces, and contain air. Into the inferior meatus there opens a passage-way from the cavity of the orbit known as

THE NASAL DUCT

which carries the tears into the nose. The bones which form each cavity are as follows:

THE CEILING

is made by the under surface of the nasal bones, the spine of the frontal bone, the cribriform plate of the ethmoid bone and the under surface of the body of the sphenoid bone.

THE VERTICAL SEPTUM

between each cavity is made of the vertical portion of the ethmoid bone and the vomer, together with the projecting processes of the palate and superior maxillary bones, into which the inferior surface of the vomer fits; in front of these bones we have the nasal cartilaginous septum.

THE OUTER WALL

of the nose is made by the nasal processes of the superior maxillary, the lachrymal, the lateral half of the ethmoid bone containing the superior and the middle turbinated processes, the inferior turbinated bones, the inner surface of the body of the superior maxillary, and the vertical or maxillary process of the palate bone, and the internal pterygoid process of the sphenoid and occasionally the unciform process of the ethmoid bone.

THE FLOOR

is made by the horizontal processes of the superior maxillary and the palate processes of the palate bones, terminating in front and behind by two prominent projections of bone, the one in front called the anterior, and the one behind called the posterior nasal spines. There are no openings in the septum between the nasal cavities. There are, however, numerous openings in the outer wall, for instance, the opening of the maxillary sinus known as the antrum of Highmore, found in the middle meatus; the opening from the frontal bone known as the infundibulum, also found in the middle meatus; and the sphenoid-palatine foramen, which, however, transmits vessels and does not interest our purpose at present.

In the superior meatus we have the openings of the anterior and the posterior ethmoidal cells and the sphenoidal cells. In the inferior meatus we have merely the opening of the lachrymal duct.

This cavity may be divided into a portion which belongs to the sense of smell, and that which transmits sound and air. The part which belongs to the sense of smell is located in the superior and the middle turbinated processes and on the under surface of the cribriform plate of the ethmoid bones and the upper part of the vertical plate of the ethmoid. The part below this, the widest portion of the nares, is that through which the bulk of the sound and the air passes to and fro.

THE NOSTRILS

are horizontal from before backward, with apertures in front which are elliptical, the outer margin being slightly elevated. These are slightly below the bony wall of the skull at this point.

THE POSTERIOR NARES

are two elliptical openings, the greater diameter being vertical, and the widest portion of the ellipse being situated below. The width of the nasal fossa throughout increases from above downward. Thus the superior turbinated bone is only two sixteenths of an inch or two millimeters from the septum; while a space of from three sixteenths of an inch or from four to five millimeters intervenes between the inferior turbinated bone and the septum. The nasal cavity is so very narrow above the middle turbinated bone that that bone really forms the surgical roof for the nasal fossa, and hence the reason for my stating that the upper part of the nasal cavity is concerned in the sense of smell, while the lower part performs the dual function of transmission of air and sound. From the arrangement

of the turbinated bones, the posterior nares, when looked at by the rhinoscopic mirror, reveals the inferior and middle turbinated processes, bounding partly the inferior and middle meatuses or inferior turbinated processes of the ethmoid and turbinated bones. These processes play a very important part in disintegrating the sound when it passes through the nasal cavity. As you will observe, the turbinated bones, as they are called, (meaning the superior and middle turbinated processes of the ethmoid and the inferior turbinated bones) are inclined backward and downward toward the posterior nares, to which I have already alluded as being openings in the upper part of the pharynx; you will observe further, that there can be made a continuous arch from the posterior wall of the pharynx directly up through the posterior nares and into the nasal cavity, and, if need be, to its ceiling, and thence forward to the cartilages of the nose, the curve finally ceasing at the opening in the anterior nares, or the openings of the nose.

If we further analyze these bones we will see that the passages are still further prolonged into the interior of these bones by the opening of the antrum of Highmore in the upper jaw, the opening of the infundibulum in the frontal bone and the openings into the body of the sphenoid and the cells of the ethmoid bone. This will still further allow the sound to be disintegrated, or absorbed, if you will. It is then no wonder that when the switch or soft palate is allowed to intercept the sound as it comes from below upward, that sound which has to pass through the nasal cavity should be muffled, and should acquire that peculiar tone which we now call nasality.

Situated in the outer and upper part of the pharynx we have the openings of

THE EUSTACHIAN TUBES

which lead into the middle ear, carrying the vibrations of sound made in the larynx, into the ear. It is a noticeable fact that when you are speaking to a deaf person, he will involuntarily open his mouth. The reason for this is that by so doing the trumpet-shaped expansion of the Eustachian tube is brought in more direct line of vibration of sound, as it will pass directly through the buccal cavity, because of the position of this Eustachian tube being just above the soft palate and practically on a line with the hard palate.

THE NASAL MUCOUS MEMBRANE.

This is a highly vascular, bright red, sensitive membrane closely connected with the periosteum of the bone. It has not the same

thickness throughout its extent, being thickest over the turbinated bones, especially the inferior turbinated bones. It is thick also on the nasal partition and on the floor of the nasal cavity. It lines the sinuses, or cavities in the bones, and in these cavities it is thinest and least vascular. It will, of course, reduce the size of the foramina communicating with the nasal cavity. It closes the foramina of the cribirform plate of the ethmoid; likewise the spheno-palatine and the pterygo-palatine, the petrygoid and the naso-palatine foramina. It will not, however, close the nasal duct from the lachrymal sac which empties into the inferior meatus, as already mentioned. The nasal mucous membrane, except in the upper or olfactory portion, and on the nasal cartilages, has an epithelium of the columnar ciliated variety. On the cartilages the epithelium is of the squamous variety, and is continuous with the epidermis of the nostril. There is a great increase in the vascularity of that portion of the mucous membrane where the sense of smell is lodged. At the back part of the nasal cavity the mucous membrane is abundantly supplied with glands, which are most numerous about the middle and back parts of the nasal cavity, and are largest on the back part of the partition. It is not worth while here to speak of the arteries or the nerves which supply this cavity.

From a practical point of view it may be of interest to state here as a point of relation of the nasal and the pharyngeal cavities, that it will be readily understood that inflammation of the lining membrane of the nasal cavity, known as coryza, may extend to the pharynx by way of the posterior nares and may also extend up the Eustachian tube, causing some deafness. It may reach the lachrymal sac and the conjunctiva, or the membrane which lines the eyelids, through the nasal duct and may extend into the frontal sinuses and into the antrum of the maxillary sinus, producing frontal headache and pain in the cheek, and sometimes pain in the ear. These relationships are often demonstrated in a severe cold in the head.

The septum of the nose is rarely straight in the adult, the deviation being most often toward the left. It is, however, straight in children, and remains so up to the seventh year. In the adult the septum deviates in about twenty-six per cent of all persons. The deviation may follow an injury. It has been thought that the deviation of the septum may seriously interfere with the singing voice.

Mr. HUBBARD: I have been able to understand but very little of the lectures which Dr. Hewson has delivered, but the little I did understand has been ample compensation for the pleasure and instruction of listening to them. I would therefore propose the following resolution:—

Resolved, That the thanks of this Association are hereby tendered to Dr. Hewson for the admirable manner in which he has treated subjects of peculiar difficulty and of great importance, and for the courteous and painstaking care which he has shown in exhibiting to us his anatomical preparations, and answering all our questions.

Miss YALE: I want to second this resolution most heartily, and extend the thanks of the Institution at Northampton to Dr. Hewson for all he has done for us. We feel that such lectures are of great importance. We hope that next year we shall all be able to understand Dr. Hewson better, because we shall have been studying these subjects through the year.

Miss FULLER: I would like to add the thanks of the teachers of the Horace Mann School for the Deaf in Boston. We have listened with the greatest interest to Dr. Hewson's lectures and have wished that they might be extended through the whole course of instruction here. Perhaps it is not inopportune at this time to express our thanks to the Board of Directors for having provided these valuable lectures, and to ask that in future we may have a similiar course covering the entire session of the Association.

THE PRESIDENT: It is with extreme pleasure that I present this resolution for adoption. I am sure we all appreciate the very great value of the lectures we have received, and the admirable way in which they have been delivered. I think the Association will best show its appreciation of these lectures by a rising vote of thanks to Dr. Hewson.

DR. HEWSON: Mr. President, may I say a word. I wish to express my sincere thanks for the kind reception and the attentive manner in which I have been listened to here during the three hours that I have been appointed to say something to you. It is seldom that one in my profession has to present subjects as I had to present them to you, and I can assure you that to an earnest teacher, as I hope to become, it is most gratifying to have the attention and the interest which you have all manifested here.

CROSBYSIDE FROM THE LAKE—LAKE GEORGE.

SCHOOL OF PRACTICE.

FRIDAY, JULY 3, 1891.—2.30 P. M.

Miss Yale continued the school of practice by calling on Miss Florence C. McDowell to exhibit her methods of instruction with the aid of two of her pupils who were present. Miss McDowell is Principal of the Oral Department of the Pennsylvania Institution for the Instruction of the Deaf and Dumb, Philadelphia, Pa.

Miss McDowell said that one of the children had lost her hearing when she was a baby, the other when she was four years of age. The first had no speech when she entered school, the second had the remains of the speech of a four-year-old child, but it was so imperfect as to be largely unintelligible. They were both totally deaf and had been under instruction six years.

"Our first step in teaching a deaf child to speak," Miss McDowell said, "is teaching it the elementary sounds of our language. The child is taught to imitate the teacher; for instance, in teaching the sound of $\overline{oo}$, the teacher takes the proper position and requires the child to place its vocal organs in the same position, and, to convey the idea of voice, requires it to put its hand on her throat to enable it to feel the vibration caused by the voice." (Here the vowels ah, ow, o, e, etc., and the consonants p, t, f, k, etc., were written upon a slate and the girls asked to speak them. This they did so that they were distinctly understood.) "As soon as they are able to speak a few vowels and consonants, combinations such as po, too, fow, ok, etc. are formed."

In reply to a question as to whether vowels or consonants were taught first, Miss McDowell said that it depended very largely on the pupil, some found difficulty with the vowels and would take consonants more readily, and vice versa. She further explained that

she believed that the element or word should always be spoken before being written. She believed very strongly in this for two reasons; first, that the importance of speech as a means of communication would thus be more permanently impressed on the mind of the pupils; and second, that it made better speech-readers. If writing was resorted to, they had much less practice, therefore less ability in speech-reading. Words such as "skip," "smart," "flap," "scoop," etc. were written on the slate for the children to read at sight; and some one suggested that the word "Caldwell" should be spoken to them and that they should speak and write it. This was done ; one of the girls wrote it correctly, the other made a slight mistake which she afterward corrected.

Miss McDowell said also that some teachers complained that a mechanical articulation drill lacked interest for pupils. This should not be the case, and if ingenuity was exercised to vary the drill, as much interest and ambition to excel may be excited as when language is used. As soon as possible simple words should be given, taking pains to make a careful selection so as to use sounds already learned.

A number of questions on general topics were here asked the pupils, testing their ability to speak and understand what was spoken to them.

Miss McDowell proposed that some one in the audience should suggest words to be used in sentence-building by the children. Several words were given and the sentences correctly formed by the pupils. As a test of the intelligibility of their speech, Prof. Gordon proposed that one of them be asked to read from a book. One of Miss Sweet's readers was handed to the girl who had no speech when she entered the school, and she read a story about a little girl's visit to the seashore. Several members of the Association expressed themselves as entirely satisfied with the result. Then Mr. Crouter, to test the child's knowledge of what she had read, questioned her very closely, in one case asking a question intended to puzzle her, but in every instance the answers were satisfactory.

THE PRESIDENT : I observe in the speech of these children a peculiarity which is very rare in the articulation of the pupils of most of our schools ; and that is continuity of the whole phrase. I noticed the same thing in Mr. Paul Binner's pupils. Do you give any special exercises to obtain continuity ? Do you make a particular point of that ?

MISS MCDOWELL : We try from the very beginning to do that.

The PRESIDENT : I am sure it would be very helpful to know how you do it.

Miss MCDOWELL : In illustration of our method I will take the phrase "a book." Frequently the pupil gives "a" explosively, exhausting its breath, and after an interval gives "book" in the same manner. We show them, again calling into use the sense of touch, that this is not correcct, but that the words follow each other smoothly and rapidly. In the same way with sentences, that several words may be said in one breath and that the voice does not cease abruptly after every word.

Miss Yale then called upon Miss Ella C. Jordan to bring her pupils on the stage.

Miss ELLA C. JORDAN : The two pupils who are present with me from the Horace Mann School, are illustrations of my work by the word method. Bertha Newhall, now thirteen years of age, was born deaf. Until she was three and a half, her mother had no suspicion that deafness was the cause of her inability to speak, and so had unconsciously begun to train her eyes to recognize and her mouth to use speech. She persisted, as all mothers of little ones do, in repeating single words over and over again to her and in requiring her to make some response to those words. When the child, sitting upon the floor, wanted to be taken up, her mother would say "up" and insist that Bertha should make some attempt to repeat it before she would lift her, and so with other words.

She was so slow in learning to speak that, at the suggestion of a friend, her mother took her to see a physician who frankly told her the child was totally deaf and had probably never heard a sound. He then advised her going to see Miss Fuller, who told her to continue as she had begun, encouraging Bertha to use words and to take directions through speech. This she did until Bertha was between four and five years of age when she entered school.

Miss Fuller thought this a good opportunity to try the word method, and asked me to take Bertha into my room and give her the odd minutes that I could spare from my class. I should, perhaps, say here that I had a class of older pupils, who use speech constantly.

Soon after this another child, Mira Holden, was brought to school. Her mother supposed her to have been born deaf. We soon, however, found that she perceived sound, though unable to hear speech, and so had never learned to talk. She, too, was put into my room, and with both of the children I at first used very simple

language, both oral and written, giving them directions which they illustrated, such as, "Shut the door," "Open the book," "Sit down," "Pick up the handkerchief," and many others, and asking them questions, beginning with, "Who," 'Where," "How many," "Do," "Can," etc. Another exercise was to name an object. The children reading the word from my lips would attempt to pronounce it, then would find the object and afterward write the name upon the blackboard. Words learned in this way were copied into books and were used in various ways, but chiefly for reference, as when they failed in spelling, they were told to look in the book and find the word. When they tried to tell me anything, using as they did at first single words, I helped them to make a sentence and to repeat it several times. These sentences often served as models for future use. It was not long before they could frame many sentences, telling their little experiences at home and on their way to school, and asking a variety of questions. Primers and illustrated books were put into their hands, and they were encouraged to find familiar words and descriptive sentences.

These children having always been accustomed to seeing speech, look for it as naturally as a hearing child listens for the sound of the voice. A few days ago, when told that a teacher was to give an account of a visit she had made to a distant city, they begged that she might speak to them rather than write it.

While I think this method is very valuable in teaching children to use speech readily and naturally, I cannot help seeing that the articulation suffers in consequence. The children often say, "Oh! I have so much to tell you, I can't stop to speak carefully." But I think as in the case of hearing children, a desire to excel in speech, as in other branches of study, will make them thoughtful and careful in overcoming faulty speech. One of the daily trials which Bertha and Mira have to bear is that there is not time enough for me to listen to half they have to say, and they often resort to letter writing. I have brought with me two such letters. This one is full of evidences of the haste in which it was written. She had something to tell me, which to her was very important, but didn't want to take the necessary time to write it carefully:—

SOMERVILLE, January 14, 1891.

MY DEAR MISS JORDAN:

I thought I would write a letter to you now, as if I didn't write it at all to you, I would have to talk to you at school-time, but remember that I do not have much time. This morning my mother gave me 16 cents copper, and I gave the 10 cents to the conductor, and he gave me a eight

check to Back Bay and two cents back, that makes eight cents left for my other fare this afternoon. I asked the conductor of Back Bay (that was in the after-noon), to give me eight cents check to Cambridge and he said "Cambridge" I told him "yes, sir;" but what do you think he did, he punched the wrong way, and I had to said, "that is not the one I wanted, I wanted Cambridge and won't you please punch Cambridge." He said, "Well if you wanted me to punch Cambridge you will have to give me eight cents more." Well I thought it was very funny, so I said, "please stop now." I got out of the car with the check with me, saiding to myself, "I never saw that conductor before, but oh dear I don't know what to do, if I got the Cambridge car the conductor would have turn me out." So I thought in a minute "Oh I guess I can see Gertie and Mamie walking, well I guess I am going to meet them." So I went. They said I had better go to school, so I went found that nobody was there, except Miss Williams, and Miss Sarah Jordan, but didn't say a word to them and I went home feeling quite trouble. I began to think I may go and walk from the depot to my house, but I think I had better go to my Auntie Grant's house, and found her and gave me the 5 cents for me to go home, and I thanked her very much and said I will pay her back. I got home at 4 o'clock. My mother and I found the conductor's date was not on the check. I told her that perhaps he has forgotten to write it. When I went home I saw you getting the Brookline car (I mean the electric car). I saw Miss Tripp, Mary and Mary cousin walking along the street. They didn't see me at all. That is why I say that I must write a letter to you, so that I will not have to talk at school-time. Good bye with lots of love from your friend

MIRA W. HOLDEN.

EAST SANGUS, Jan. 15, 1891.

MY DEAR MISS JORDAN.

I have just finished reading my lessons as papa and Mama are both reading so I thought I might just as well write you a letter.

I am going to study real hard so that I can be ready when Miss Fuller is ready for me to go to another school. I hope that very soon Miss Fuller will let me go, but I should not like to leave you. Do you remember I told you I was going to the Milliners to-day, well when I got down the Depot it was about ten minutes of three and I sat down and a great surprise came to me. My aunt & her girl had just got home from the Hospital. I was so surprised to see Annie as we call her that name. She was taken to the Hospital a month ago. She had a very bad sore on her leg that troubled her a great deal. But she is a great deal better now, I could smell cabonic acid in the steam-cars when she was coming home.

I have not read the papers much during the month. But I heard that the Indians shot a man named Casy and they said that he was going out to the Bad Lands to find the Indians but an Indian came out and said "Hush not a word, if you do I'll shoot you." I think I ought to be ashamed of myself for I have not read the paper for a long time.

I want to tell you that perhaps pa will let me bring a paper book which will interest the children very much It tells all about the Chinese using tea.

I hope that when you read this, you will correct it for me. It is time for me to go to bed, so I will say Good Night, with a great many kisses for you.

From your loving pupil,

BERTHA E. NEWHALL.

The help which these children received from the older pupils, in the beginning of their work, has suggested to me the advisability of allowing little ones to have an opportunity each day to talk with older pupils. It would tend to make the older pupils more accurate in their pronunciation and correct in their construction of sentences. Not long ago an inattentive boy from a primary class, was allowed to sit in a room where more advanced pupils were using speech fluently and with apparent enjoyment. Upon his return to his own room, he told his teacher he wanted to talk very well, so that he might go to that room.

[The children who wrote the above letters had been in school for eight or nine years.]

MR. CROUTER: Did I understand you to say that, from your experience you rather favor the syllabic than the word method?

MISS JORDAN: No; I use the word method almost entirely. I begin from the very first by giving them words.

THE PRESIDENT: We want to consider that word method very carefully; and it is unfortunate that Mr. Greenberger is not here to tell his experience.

DR. WILLIAMS: Do I understand you have used both the syllabic and word method?

MISS JORDAN: I have used both.

MR. WESTERVELT: I have to announce to the Association that Dr. Bell will deliver the next lecture, on the Pharynx and Mouth in Their Relation to Speech.

THE PHARYNX AND MOUTH IN THEIR RELATION TO SPEECH.

FRIDAY, JULY 3, 1891.—3.30 P. M.

In my last lecture I told you about a man with a harmonium reed in his throat, in place of vocal cords. Now, ordinarily, there is a vast deal of difference between the sound of a harmonium, and the sound of the human voice, and yet in this case the reed produced the effect of a human voice when the man spoke. To the ear, therefore, it made all the difference in the world, whether the reed was vibrated outside or inside the man's throat. Now, we have no reason to suppose that the thorax and lungs operated in any different way from the wind chest of a harmonium. They simply supplied air to set the reed in vibration. The difference of effect, therefore, must have been due to the parts above the reed. In other words, the pharynx, mouth, etc., were the agencies involved in changing the harmonium effect into a human voice. Consider for a moment, the nature of the difference between the sound of a harmonium reed and a sound of similar pitch sung by the voice. The same note may be played upon a piano, a violin, a flute, or a trumpet, and yet each sound has an individuality of its own. We can tell by ear, at once, which instrument is used, although all the notes may be alike in pitch, and equally loud. The sounds differ from one another in "character," "quality" or "timbre," and it will thus be understood that the pharynx, mouth, etc., affect the quality or timbre of the voice.

We can recognize that every sound possesses the elements of pitch, loudness, and quality. It matters not whether the sound be produced by the human voice, by a musical instrument, by the rustling of leaves, or by a knock upon the door—it has a certain

loudness, a certain pitch and a certain character, or timbre of its own, by which we recognize it from other sounds of similar pitch and loudness.

Now, when we study the production of voice, we find that these three characteristics originate principally in three different parts of the vocal apparatus.

> (1) The pitch of the voice is determined by the vocal cords; (2) the loudness by the abdominal or expiratory muscles; and (3) the quality or timbre by the parts above the vocal cords.

1. The lips of the glottis open and close with great rapidity, and the frequency of the vibration is mainly determined by the tension of the vocal cords.

2. Air escapes from the lungs through this vibrating glottis in a series of puffs, and the force of emission is chiefly determined by the action of the abdominal or expiratory muscles.

3. The upper part of the larynx, together with the pharynx, nares, and mouth, constitutes a passage-way, or tube, of variable size and shape, through which the vibrating current of air is passed. It is here that the voice is moulded, so to speak, on its way to the ear, and the shape of the passage-way largely determines its quality or timbre.

You can produce a crude voice-like sound by the vibration of the lips of the mouth. Press your lips very firmly together while you blow air between them, so as to cause the edges to vibrate. The sound produced is not very pleasant, and resembles more than anything else the hum of a bee, or the buzz of an imprisoned fly. But place these buzzing lips at the end of a tube—for example a trumpet—and at once the quality changes. Out come the clear ringing tones so familiar to us in a brass band! In this case the source of sound is found in the vibration of the lips, but the timbre or metallic quality is due to the trumpet.

In a somewhat similar manner the passage-way, or tube, through which the voice is passed, affects the quality of the sound produced by the lips of the throat; and if we could decapitate a singer in the midst of a song, so as to hear the sound produced by his vocal cords alone, I fancy we should find as great a change in the quality of the voice, as we do in the sound produced by the lips when the trumpet is removed. The beauty of the voice would be gone, and you would simply have a reed-like effect.

In the case of the trumpet, the character of the tube affects not only the quality, but the pitch of the sound produced. For example: If you lengthen the tube, the lips vibrate more slowly, and the sound becomes lower in pitch. In the instrument of speech, however, the lips of the glottis are so admirably adapted for independent vibration, that changes in the passage-way do not affect their rate of vibration, but simply change the quality of the resulting sound.

A number of years ago I visited a large school for the deaf, and taught all the pupils to use their voices. In a few cases the effect was decidedly unpleasant, the voice resembling somewhat the cry of a peacock. The effect indeed was so unnatural and distressing to the ear that some of the the teachers expressed the opinion that the vocal cords had been affected by the disease that had caused deafness. They thought, therefore, that it would hardly be worth while attempting to teach these children to speak. Knowing that the quality of the voice is chiefly determined by the shape of the passage through which it is passed, I did not consider it necessary to assume a defect in the vocal cords, but rather sought the cause of the peculiarity in some constriction of the passage-way higher up than the vocal cords.

I was careful to avoid discouraging the pupils by any expression of disapproval, so they were entirely unconscious of the fact that their voices were unpleasant. They had no hesitation, therefore, in repeating the disagreeable sound as often as I desired ; and I encouraged them to repeat it a great many times, so that I might study the effect and become familiar with the sound. I then found it possible to imitate the effect myself. This was proof positive that the existence of the peculiarity was quite consistent with the possession of perfect vocal organs. Having acquired the ability to repeat the effect, I set myself to work to find out what I did with my mouth during the production of the sound. I could feel a constriction somewhere in the back part of the mouth, and therefore examined my vocal organs in a hand mirror while I depressed the tongue so as to exhibit the whole of the pharynx. At once the cause of the peculiarity became manifest. The muscles constituting the side walls of the pharynx were seen to be forcibly contracted, and they were approximated so closely together as almost to touch. After a little practice I found myself able to move these muscles at will without making any sound. Then I tested the effect of the motion upon the quality of the voice. When the muscles were relaxed and the cavity of the pharynx expanded the

quality of the voice was good, but the moment the side walls of the pharynx commenced to approach one another (see dotted lines in Fig. 2.), the character of the voice changed. It acquired a

Fig. 2.*

1. Soft palate. 2. Uvula. 3, 4. Anterior pillars of the soft palate. 5, 6. Posterior pillars of the soft palate. 7, 8. Tonsils. 9. Tongue. 10. Back of the pharynx.

The posterior pillars of the soft palate (5, 6,) are capable of approximation, as shown by dotted lines.

peculiar metallic ring, somewhat like the tone of a brass musical instrument. The effect became more and more disagreeable as the side walls approached, until the peculiarly distressing effect was produced, which I have likened to the cry of a peacock. Having gained this information I attempted to improve the voices of the children. For this purpose I gave them hand mirrors and taught them to depress their tongues so as to render visible the soft palate and back of the pharynx. I then made them look into my mouth while I silently contracted and expanded the pharynx. After some practice they were able to imitate the action.

I then placed their hands on my throat while I repeated the exercise with voice. Their first attempts at reproduction were failures; the moment they sounded the voice, a powerful contraction of the muscles about the pharynx became visible, and the usual disagreeable effect was produced. By means of the mirror, I directed their attention to the constriction, and told them to expand the pharynx, as they had done before when they made no noise. At first they

* Reproduced from "Voice, Song, and Speech."

were unable to relax the muscles of the pharynx, without stopping the voice, but, after some practice, they succeeded in doing this, and at once the voice became natural and pleasant in quality.

The cavity of the pharynx may be roughly likened to a room with four walls. The back part of the tongue constitutes the front wall of the chamber, and opposite to it is the back wall of the pharynx. The side walls are formed by muscles that extend upwards to the soft palate. The approximation of these sides walls, as I have already explained, imparts to the voice a disagreeable metallic quality. The front and back walls, too, are capable of approximation, and in this case, also, the quality of the voice is injuriously affected. For example: The tongue may be held so far back in the mouth as to cause the base of the tongue to come almost into contact with the back of the pharynx. The voice then acquires a peculiar "guttural quality." I have heard this kind of voice produced by deaf children, but it is more common, I think, among persons who hear. It is rarely heard during the act of speech, but many persons affect this guttural quality of the voice when they sing. The "metallic quality "of voice, on the other hand, is quite common among the deaf, although it is rarely so marked as to be painful to the ear. Many hearing persons also possess it in a greater or less degree,—especially persons who use their voices much in the open air. For example, the rasping voice of the street hawker is of this description.

Another peculiarity of voice very common among the deaf, is "nasal quality." This is occasioned by the habitual depression of the soft palate. By means of a hand mirror, the cause may be shown to a deaf child.

The soft palate is capable of elevation and depression. When it is raised it fits closely against the back of the pharynx, forming a ceiling to the pharyngeal cavity. When it is depressed, it hangs down like a curtain, leaving a passage-way behind it, which leads into the nares or nasal passages.

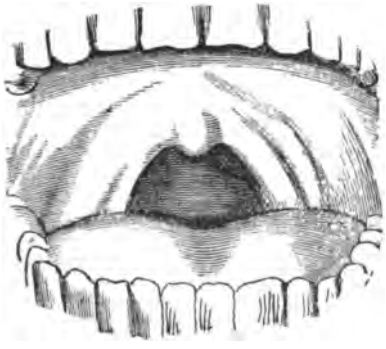
I would recommend every teacher of articulation to learn to control the movements of the soft palate and the muscles of the pharynx, so as to be able to exhibit the action of the parts to pupils. The first point you have to learn, is to depress the tongue so as to unveil the pharynx and soft palate. Many persons find difficulty in doing this, but by persistent efforts before a mirror, all can acquire the power. Now watch the soft palate while you breathe gently, sometimes through the mouth, sometimes through the nose. At first the soft palate appears to move about in a most mysterious

manner by itself, without any volition on your part. Now it goes up, and then the next moment you see it hanging loosely down. By watching these motions in a mirror, and attempting to control them, you will soon find yourself able to elevate or depress the palate at will. Now sound the voice continuously, and observe what effect is produced upon its quality by the movement. You will notice that the moment the palate falls, the voice acquires nasality, and that this effect disappears when the palate is raised into contact with the back of the pharynx.

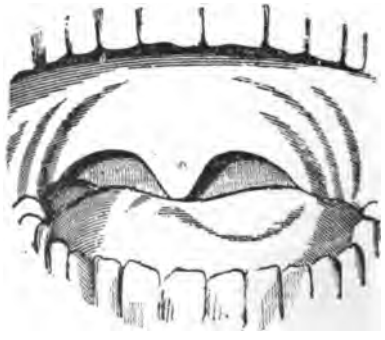
During the act of speech, the soft palate is raised continuously, excepting when the sounds of *m*, *n*, and *ng*, are uttered. In order to correct a nasal quality of voice, therefore, your pupil must raise his soft palate. The question arises, however,—how are you going to make him do it?

Various expedients may be resorted to, such as the common one of telling him to blow an imaginary feather away from his mouth while he speaks; but these are all indirect methods, and do not touch the root of the matter. I would recommend you to go for the soft palate itself, directly, with a hand-mirror. Teach your pupil to elevate and depress it at will. Direct the action with your hand.

When you raise your hand let him raise the palate (Cut A) and keep it elevated till you give the signal for depression (Cut B). Then



(Cut A).



(Cut B)*

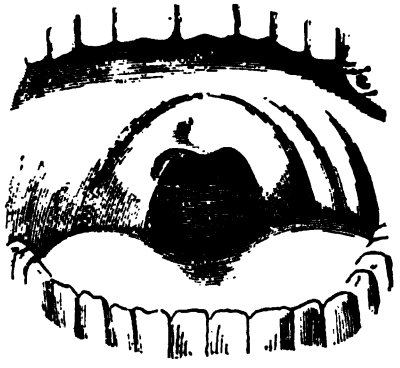
let him keep it depressed without motion, till you direct him to raise it. *Control over the vocal organs is gained not so much by moving them as by keeping them still.* Keep the soft palate depressed and *still* for a long period of time, and then raised for an equal length of time. Do this at first silently, and then after-

* These cuts are reproduced from "Voice. Song, and Speech."

wards with voice. Elevate and depress the palate without stopping the voice but retain the elevated or depressed position for a considerable period of time.

When your pupil can do this without looking in the mirror you may usefully vary the exercise by requiring him to raise or depress the palate while at the same time he prolongs a vowel sound. (For example ; *ah*, or *ee* or *o*.) Then let him rattle off a series of vowels without stopping the voice. (For example: *ah ee o ee; ah ee o ee* etc.), elevating or depressing the palate as you direct. As the ultimate object to be gained is ability to retain the soft palate in the elevated position continuously during speech, there should be no rapid alternations of elevation and depression. He should repeat the series of vowels many times in succession with the soft palate raised, and many times with it depressed, but the voice should not be stopped excepting when it becomes advisable to take breath.

The uvula, the pendulous extremity of the soft palate, seems to have no special function in speech, at least in the English language, and I have known of cases where it has been excised without interfering with articulation. In teaching the deaf, however, the uvula may be found of use as an index to the pitch of the voice. A pupil may, perhaps, be made conscious of changes in the pitch of the voice, by directing his attention to changes that simultaneously occur in the length of the uvula. In most cases, the uvula hangs loosely down during the production of low tones and shrinks in size as the pitch of the voice is raised. (See Cuts A, and B.) When



(Cut C).*

the pitch is very high the uvula shrinks up to such an extent that it almost disappears (Cut C.) While this rule is not invariable, the effect is so commonly produced, as at least to be worthy of note.

* This cut is reproduced from " Voice, Song and Speech."

Every change in the shape of the passage-way, through which the voice is passed, occasions a corresponding change in the quality of the voice, and I have pointed out the causes of certain disagreeable effects. In order to render the voice sweet and pleasant to the ear, it is necessary that the soft palate should be raised into contact with the back of the pharynx, and that the whole cavity of the pharynx should be expanded, so that the passage-way there should be free and unobstructed. Any constriction in the pharynx is fatal to the beauty of the voice.

The mouth passage also affects the voice, imparting to it "vowel quality," and changes in the shape of the mouth-passage, produced by the action of the tongue and lips, occasion changes of vowe quality. In singing different vowel sounds the voice may have the same pitch and loudness, and yet each vowel remains distinct to the ear. Vowel differences, therefore, are differences in the quality or timbre of the voice; and vowels themselves are in reality *qualities of voice* to which we have given specific names, and which we employ as elements of speech.

I do not propose to-day to enter into any detailed description of the positions assumed by the tongue and lips, during the production of vowel sounds, as most of you, I know, are familiar with the subject. I shall rather attempt to show you why it is that changes in the shape of the cavities of the mouth, pharynx, etc., occasion changes in the quality of the voice.

When we prolong a vowel sound without varying the pitch of the voice, the effect produced upon the ear is not simply that of a single musical sound, but of a chord containing a number of musical tones of different pitch. One of these tones is so much louder than the others that it determines the apparent pitch of the whole combination. The other tones are so feebly produced, that it takes a skilled ear to recognize them as musical effects at all; and the untrained ear simply perceives them as the quality or timbre of the sound. When a number of vowels are sung successively without varying the pitch of the voice, a trained ear readily perceives that the partial tones change in pitch with every change of vowel effect. The loud fundamental is due to the vibration of the vocal cords, and the "partial tones" are caused by the resonance of the air in the cavities of the mouth.

"What do you mean by 'the resonance of the air in the cavities of the mouth?'" I fancy some of you ask. In order to answer

this question I have brought a few empty bottles from the dining-room table and from the kitchen of the hotel. Here we have a pepper-pot, a pickle-bottle, a mustard-pot, a vinegar-bottle from the cruet-stand, and a few other bottles of different shapes and sizes. Now let me blow into the mouth of one of these bottles. At once you hear a musical tone something like that produced by an organ pipe. I shall now blow into the mouths of the others. You observe that each bottle has a resonance tone of its own. In some cases the pitch is high, in others low. Observe the pitch of the bottle I hold in my hand. I shall now pour in a little water so as to reduce the air space within. The bottle produces a tone of higher pitch than it did before. I pour in a little more water and again the pitch rises. In fact, the smaller the cavity is made the higher does the pitch become. Now you have in your mouth a bottle-shaped cavity, and in this case also the air within has a tendency to vibrate at a definite rate so as to produce a musical tone. When the size of the cavity is reduced by elevating the tongue, and bringing it further forward in the mouth the pitch becomes higher, just as the tone produced by the bottle rose in pitch when I poured in water. I am afraid you would hardly like me to demonstrate the truth of this statement by blowing into your mouth as I did into the bottle ! If you are anxious to make the experiment you can blow into your own mouth with a pair of bellows ! A still simpler way, however, of testing the effect is to blow air *through* the mouth from the lungs. For example : whistle. The pitch of the whistle rises as the tongue is advanced in the mouth.

Let me direct your attention once more to the bottle. The pitch rose when I poured in water, and of course I can lower it again, if I choose, by pouring out the water. Instead of doing this, however, I shall change the pitch in another way, without varying the size of the air space within. While I blow into the bottle I shall gradually cover its mouth with my hand. The tone, you observe, falls in pitch as the orifice is reduced. You see from this that you can vary the pitch ; (1) by varying the size of the cavity, and (2) by changing the size of the opening into it. Allow me to illustrate these two ways with my mouth.

1. I shall assume the position for the Visible Speech symbol "Back centre-aperture" (German *ch* in the word *nach*); and then glide the tongue gradually forward to the position for "Front centre-

aperture" (*h* in the word *hue*) thus reducing the size of the cavity in front of the tongue. . The pitch of the sound rises as the tongue is advanced in the mouth.

2. I shall now retain the "Back centre-aperture" position (German *ch*) and gradually contract the aperture between the lips until the position for the English element *wh* is reached. The pitch falls as the labial aperture is reduced.

In forming German *ch* compressed air from the lungs escapes through a very small aperture between the back of the tongue and the soft palate, occasioning a rustling sound in the mouth. Although this effect constitutes a noise rather than a musical tone, you have no difficulty in recognizing that it has pitch.

I think that you should teach all your pupils to produce this sound, because the position of the tongue enters into the composition of three English elements which are usually pronounced in a very defective manner. I allude to the sounds of *wh*, *w*, and the vowel *oo* in the word *too*. In these cases the aperture between the lips is so small as to prevent the pupil from observing the position of the tongue, which position is essential to the production of the sound. He imitates the labial aperture perfectly, but fails to give the back-tongue position, and hence produces only a crude approximation to the correct sound.

A short time ago I visited one of our best articulation schools, and went through all the classes in search of a good *oo*. The only children who gave the sound correctly were semi-deaf, or had acquired speech by ear. There is really little difficulty in teaching the sound if you commence with the lingual element by itself, and then modify it by rounding the lips. Commence with German *ch*. Round the lips and you have *wh*. Add voice and you have *oo*. For all practical purposes this may be considered identical with *w*. When the two elements are in juxtaposition the difference is readily perceived by the pupil. For example: Pronounce the word *woo*. The labial aperture is visibly smaller for the consonant than for the vowel. The only trouble in teaching this sound arises from the fact that a very slight change in the lingual position destroys the *oo* effect. If the tongue is only a little too far forward or a little too far back, the position may yield a very respectable German *ch*, and yet fail to produce a good *oo* when the lips are rounded and the voice is sounded. In such cases the pitch of the German *ch* will tell you the nature of the defect, and how to remedy it. If the pitch

is too high the tongue is too far forward; if it is too low the tongue is too far back. You can obtain your standard for comparison in the following way: Pronounce a good *oo.* Convert it into *wh* by substituting breath for voice, and then force your lips apart so as to obtain the effect of the lingual position alone. Observe the pitch of the German *ch* thus produced. If the pitch of the sound produced by your pupil is higher than this, direct him to place the tongue further back; and if it is lower, tell him to bring the tongue forward.

The pitch of the mouth can be brought out by other means than by blowing air into or through the cavity. Resonance is caused whenever a sound of similar pitch is produced in the neighborhood. For example: Here is a tuning fork, and upon the table is a bottle which has the same pitch. I hold the vibrating prongs of the fork over the mouth of the bottle, and at once its resonance tone is loudly evoked. Here is another bottle, but it remains silent when the fork is applied. Upon blowing into it you perceive that the pitch is too low. Let me tune it by pouring in water. It still fails to respond—the pitch is now too high. Upon pouring out a little water the bottle resounds, but very faintly. It has almost the same pitch as the fork—but is still a little too high. I pour out a few more drops, and now you hear the full and loud response made when the fork is applied. Let me hold the fork in front of my lips while my mouth is in the position for *wh.* You have no response, because the proper tone of the mouth cavity is different from that of the fork. Upon tuning the cavity by shifting the position of the tongue, the mouth resounds as the bottle did a few moments ago.

In these cases you have resonance produced by "sympathetic vibration." If you have in the same neighborhood two bodies that tend to vibrate at the same rate, set the one vibrating and the other vibrates of itself—out of "sympathy" as it were! I shall show you another case. Here we have a piano. I shall depress the pedal so as to release all the strings, and then sing into the instrument. When I stop singing you will observe that the piano echoes my voice. That string of the piano that had the same pitch as my voice was set sympathetically into vibration. A similar effect is produced in the case of vibrations which are too slow to produce the sensation of sound. For example: If two clocks having pendulums of similar length are attached to the same wall you need only set one of them going, for by and by the other will go by itself. Of course we cannot suppose that the pendulums had any particular "sympathy" or affection one for the other—or that the string of the piano experienced any emotion at

the sound of my voice ! Every mechanical effect must have a mechanical cause—and the facts of " sympathetic vibration " require explanation. Let us consider the case of an oscillation slow enough to be followed by the eye. For example : Imagine one of your pupils to be upon a swing. Stand behind him and give him a shove. The swing moves forward a little way and returns upon its path. It oscillates backwards and forwards at a definite rate for a long time before it comes to rest. Indeed, were it not for friction and resistance of the air it wouldn't stop at all. Inertia would keep it going; and one shove would be sufficient to set it vibrating forever! In spite of the resistance of the air, the effect of a single push is retained through many vibrations. If, then, you push the swing again at the proper time, the motion is increased. Very slight efforts of the hand will suffice to set the swing into full vibration if the impulses are properly timed to the movements of the swing so as always to come during the forward motion alone. Under such circumstances the effect of each successive shove is added to that of the last, and a cumulative effect is produced. The amplitude may become very great even though the individual impulses are slight. If the shove is given at the wrong time, that is, when the swing is moving on its backward path, then every impulse tends to stop the vibration. Each push retards the motion to a certain extent, and a series of very slight impulses will bring the swing to rest. For example: The resistance of the air stops it in time if you leave it alone. The air, in effect, shoves the swing at the wrong time at each vibration. Make it push *at the right time*, and the converse effect will be produced. You could set the swing going, for instance, by puffs from a pair of bellows!

Now the strings of the piano are in effect swings, each tuned to vibrate at a different rate from the others; and puffs of air from my lungs set them going when I sang into the instrument. At each opening of the glottis a puff of air escaped from the lungs, and all the strings of the piano received a shove. The first shove started them all swinging, but the second caught some of them on the return path and stopped their motion. The motion of others was retarded later on; but that string which had the same rate of vibration as my vocal cords, received each shove always at the right time, and was thus set into vigorous vibration. It continued sounding for some time after I stopped the voice, just as a swing continues in vibration after you stop pushing it. The same kind of action took place when the tuning fork was held over a bottle of similar pitch to its

own. At each descent of the prong the air in the bottle received a shove; and the air was thus set into vibration, as you set a swing into vibration by the hand.

A similar action took place when I held the vibrating fork in front of my lips. At first no sound was produced, but when I shifted the position of the tongue, so as to tune the mouth-cavity to the pitch of the fork, resonance resulted, and you all heard the effect. I have no doubt that the Scotchman with the artificial larynx could have produced the same effect, if he had slipped a tuning-fork into his throat in place of the harmonium reed. Imagine a multitude of tuning-forks of different pitch to be massed together in front of the mouth and all simultaneously to be set in vibration. It should then be possible, by shifting the position of the tongue, to reinforce the tone—now of one fork, now of another—at will. Indeed under such circumstances, it would hardly be possible to assume a position of the mouth, that would *not* reinforce some fork—at least in a greater or less degree. Imagine the mass of tuning-forks to be placed in the Scotchman's throat, and similar effects would result.

Now the vocal cords, like the hypothetical forks, produce a number of feeble tones of different pitch; when we pronounce a vowel sound, the mouth-cavity reinforces, by resonance, that "partial tone" of the voice which is nearest in pitch, to the proper tone of the cavity. The effect produced we call the "vowel quality." The loud fundamental tone of the voice, so distracts the attention of the untrained observer, that he finds difficulty at first in hearing the resonance tone produced by the mouth. The best way to train the ear is to commence by observing the pitches of non-vocal sounds. Then listen for similar effects when the voice is sounded.

If you whisper the vowels *ah*, *aw*, *ōh*, *ōō*, I think you will have little difficulty in recognizing the fact that the pitch of the whisper falls as the lips are approximated. More difficulty will be experienced in determining the relative pitches of other vowels. For example: whisper the vowels in the words *eel*, *ill*, *ale*, *ell* and *shall*. The pitch changes with each vowel, but how does it change? I attempted to determine the point a good many years ago, and came to the conclusion that the vowels formed a descending musical scale, *ee* having the highest, and *ă* the lowest pitch. To my surprise, however, my father was unable to agree with me in this result. To his ear, the vowels formed an ascending series, *ee* having the lowest, and *ă* the highest pitch. The fact is, we were both right, for these vowels have a double resonance. The

passage-way for the voice extends from the vocal cords to the lips, and if you constrict it at any point, you divide it into two parts forming bottle-shaped cavities placed neck to neck. (See diagram, Fig. 3.) There is a cavity in front of the point of constriction, and another behind it.

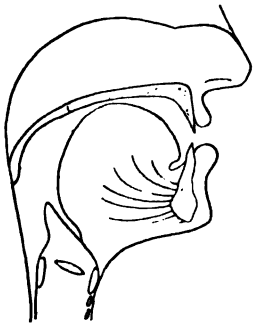


Fig. 3.

In forming *ee*, the front cavity is very small, and the pitch consequently high; but the back cavity is low in pitch, because it possesses an extremely narrow neck at the point of constriction. In pronouncing the other vowels of the series mentioned, the front cavity increases in size, and, therefore, falls in pitch; but the pitch of the back cavity rises because the neck at the point of constriction is enlarged. I can demonstrate the double resonance of these vowels by a simple experiment. I shall hold the side of a lead pencil against my cheek, and tap it forcibly with my thumb nail, so as to agitate the air in the front cavity, while I whisper the vowels *ee*, *ĭ*, *ā*, *ĕ*, *ă*. You perceive at once a descending series of sounds, in which *ee* has the highest, and *ă* the lowest pitch. I shall now hold the pencil against my throat so that each tap may agitate the air in the back cavity. Upon whispering the same vowels, the taps produce an ascending series, *ee* having the lowest pitch and *ă* the highest. The effect is improved by closing the glottis so as to convert the back cavity into a bottle closed at the bottom. The front cavity also yields a much louder effect if it is shut off completely from the back cavity, by allowing the soft palate to fal linto contact with the back of the tongue (*ng* position). In these cases, of course, the vowel positions must be silently assumed. When we pronounce these vowels aloud, feeble "partial tones," due to the resononce of the air in the back and front cavities of the mouth, mingle with the tone of the voice, and produce in our ears the sensation of "vowel quality."

Helmholtz has not only resolved vowels, by a process of analysis, into their constituent musical elements, but has produced vowel sounds artificially by a synthetical process. In place of voice, he caused a tuning fork to vibrate continuously in front of a tuned bottle or "resonator," thus producing a loud musical tone. He then selected two forks having the pitches of the partial tones he had recognized as characteristic of the vowel *ee*. One was very high, and the other low. (They represented, indeed, the front and back cavities of the mouth in forming the vowel.) These forks were then placed in front of bottles, tuned almost but not quite to their own pitch, so that the sounds produced should be very faint. The simultaneous vibration of the three forks in front of their respective resonators, or bottles, produced one loud sound, and two feeble partial tones. The effect upon the ear was that of the vowel *ee*.

Those of you who desire to pursue this subject further, may consult a paper of mine upon "Vowel Theories," which was read before the National Academy of Sciences, April 15, 1879, and was published in the *Journal of Otology*, Vol. I, July, 1879. A few reprints may be found in the Volta Bureau, in Washington, D. C.

THE PRESIDENT: Prof. Gordon has received a communication from Prof. Samuel Porter of Washington, D. C., a gentleman who knows about as much about the mechanism of speech as any man living. I am sure that we all regret Prof. Porter's absence from this meeting, and shall be glad to hear Prof. Gordon read the communication now.

PROF. GORDON: It is hardly necessary to say that Prof. Porter takes a great interest in the work of this Association. For a great many years he has been devoting his time to studies bearing upon our work. He is particularly interested in phonetics and in the promotion of speech to the deaf. It is a matter of regret to him and to me that he cannot be present. I will read his letter:—

FARMINGTON, CONN., June 30, 1891.

MY DEAR FRIEND: I got the circular and invitation yesterday from Mr. Westervelt. If it had come a few days earlier, I think I should have been induced to attend the meeting.

I notice that Dr. Bell is to lecture on the Functions of the Pharynx in Speech. should like to know what he would have to say about that. My idea is, that it is quite common to misapprehend by regarding the pharynx too much as if absolutely separated from the mouth. In fact, when the soft palate is raised in non-nasal utterance,

the pharynx and the mouth are better regarded as together forming a single cavity. There is no line of separation across the tongue, and nothing whatever as a line of demarcation, except the posterior pillars of the fauces, which in each case almost lose themselves in the walls of the passage. The pharynx comes into importance, if we regard, as I do, the *a* (*ah*) vowel as made with the place of constriction against the back wall of the pharynx, thus giving this vowel a place to the rear of the proper "back vowels," *aw*, *o*, *oo*, etc., which have the place of constriction in the soft palate. Bell might symbolize it by an additional turn ( ). This relieves Bell and Sweet from the vacillation and diversity in the place assigned by them to this vowel. The pharynx acts together with the cheeks and the soft palate in producing, by their elastic reaction, the explosion of a *p*, and, without the cheeks, of a *t*, and, by itself alone, of a *k*. I imagine also that the pharynx acts, together with the soft palate, as a cushion, and may thus be made to affect the ring of the voice or quality of tone, giving it sometimes softness, and sometimes sonority in the "oround" quality, etc.

Yours truly,

(Signed) SAMUEL PORTER.

MR. CROUTER: I have to announce that Mr. N. B. Broughton is present with us, and has consented to give us some twenty minutes' talk this evening on the subject of Negro life in the South.

(*Adjourned until 9 a. m., Saturday, July 4th.*)

CROSBYSIDE—LAKE GEORGE.

BUSINESS MEETING.

FRIDAY EVENING, JULY 3, 1891.—8 P. M.

THE PRESIDENT: I will open the proceedings by asking for suggestions as to the advisability of holding a Summer Meeting like this in the future. It has been suggested that there may be certain advantages and at the same time certain disadvantages, if this Association were to meet in conjunction with the National Educational Association. We introduce this subject to you, and should be glad to hear the views of the members of the Association expressed.

MISS FULLER: I would like to say that I quite agree with Dr. Bell as to there being advantages and disadvantages in connection with our becoming a branch of the National Educational Association, but I think the advantages would far exceed whatever might be considered disadvantageous.

MR. CALDWELL: I think we might find great difficulty in having accommodations provided like those that we enjoy here, for instance.

THE PRESIDENT: I may say that after the meeting at Madison, Wisconsin (1883), The National Educational Society extended a cordial invitation to the teachers of the deaf to join their body, which has not yet been acted upon.

HON. JOHN HITZ: I would like to say that while I see a great many advantages that might accrue from our joining The National Educational Association, I also recognize the fact of the immense growth of that Association, and am afraid we would be swamped. At the last meeting in Chicago there were 15,000 teachers. I would prefer to see a section formed for our work in the National Association. This would give us all the advantages, while at the same time preserving our organization. I will say that The National Educational Association meets at different places every year.

THE PRESIDENT: Another suggestion is, that we should meet each year in a different part of the country, as this would direct public attention to the education of the deaf to a much greater extent than if we were to hold our annual meetings at a fixed place.

MR. BINNER: How many days is the National Association in session, Mr. Hitz?

Mr. HITZ: They generally meet from ten days to two weeks. The council generally meets a little earlier, so that the session extends nearly two weeks or over.

MR. BINNER: I think if we have a fixed place, our attendance will not be so large. By going to different parts of the country the people in general will learn to know more about us. We shall be more apt to educate the public about what we are doing by coming nearer to their doors.

MR. HITZ: I would suggest whether it would not be advisable to leave this matter of joining The National Educational Association to the Board of Directors, and if they should deem it an advantage, that they should have the power to organize a section at the next meeting of the Association.

THE PRESIDENT: Another suggestion has been thrown out, and that is that we might meet next year in the West, and the year following in the South, and so on. Still another proposition is that we should let well enough alone; and if this meeting has done well to have the next one modeled after it.

PROF. E. H. CURRIER: Would it not be well to consider whether it would not be advisable to have one more session modeled after this. Perhaps then we might start out in a larger field.

MISS BLACK: I think the very idea of a Summer School is to have a distinct locality.

DR. PHILIP G. GILLETT: I believe that whatever might be suggested would have some advantage, otherwise it would not have been proposed at all. In my judgment it is for the Board of Directors to decide from all the propositions made, what seems to be most in accord with the wishes of the greatest number. I may say I think it is time for us to bring our work out of the domain in which it is held in the estimation of the public; that is, that it is a work of charity. We are associated in the minds of many with the criminal and pauper classes. A large part of the general public have a very crude conception of the work which is being done in the education of the deaf; they do not recognize the fact that it is

not a purely charitable work. I think it is our duty to so enlighten the public, as to show them that ours are not eleemosynary institutions.

Although it was pity that first impelled to this movement, pity that first influenced Mr. Thomas Hopkins Gallaudet; yet now, Mr. Chairman, ours has broadened into a distinctive department of education; and we will do great good if we bring ourselves as soon as possible into close sympathy with the great educational enterprises of the country. Yet I think it doubtful whether it would be wise to meet at the same place and time as The National Educational Convention. I am of the opinion that we are doing well here, and think we can prosecute our work much more successfully than we could, joined with The National Association, where we would be utterly swamped, as Mr. Hitz has suggested.

There is another point though to which I would refer which is as to the location of our next meeting. This is certainly a most charming place. I know of none other more so in this country. It compares in my estimation very favorably even with the far-famed Italian and Swiss lakes, Maggiore, Como, and Lucerne. However, it may be found best to carry the Association about from place to place; and I would suggest as a good location a lake in my own state of Illinois, situated near the boundry line of Wisconsin, which almost rivals Lake George in its simple and elegant beauty. I refer to Lake Geneva, and will suggest it as a good location for our next Summer Meeting.

MR. BINNER: May I offer an amendment to Dr. Gillett's last suggestion? Why not go a little further North? Why not go to Milwaukee? We would be delighted to see the Association at Milwaukee. I may say that I fully concur with Dr. Gillett in his remark about the advisability of our meeting separately, for if The National Association meets at the same time that we do, it means that as they are going to be occupied all this time with their own affairs, very few would have a chance to come to our meetings.

MR. HUBBARD: Mr. Chairman, I have been asked by some young ladies to act as their spokesman, and to suggest the Natural Bridge of Virginia as a meeting place for next year. That is one of the most astounding phenomena of this country, and is in every respect quite suitable.

MISS FULLER: I move that the matter be left to the Board of Directors to decide upon, and am sure that whatever seems best to them will be pleasing to us.

THE PRESIDENT: The Directors merely desire to get the views and ideas of the members of the Association. They will then take the matter under consideration.

MR. HUBBARD: Had we not better dispose of it now?

MR. CROUTER: I have the pleasure to report that the following schools and institutions for the deaf are represented in this, the first Summer Meeting of the American Association to Promote the Teaching of Speech to the Deaf. I should like to be corrected if I have made any mistakes, as I have been compelled to complete the list frow memory. They are as follows:—

Albany Home Oral School for the Deaf, American Asylum, Arkansas Institute, Clarke Institution, Cincinnati Day School, Central New York Institution, Day School for Deaf-Mutes at St. Francis Wis., Florida Institute, Horace Mann School, Illinois Institution, Kendall School, McCowen Oral School for Young Deaf Children, North Carolina School for the Deaf, Maryland Institute, New Jersey School, North Carolina Institution, South Carolina Institution, New York Institution, New York Institution for Improved Instruction of the Deaf, National Deaf-Mute College, Ohio Institution, Ontario Institution, Pennsylvania Institution, Pennsylvania Oral School, Milwaukee Day School for the Deaf, Portland School for the Deaf, Rhode Island School for the Deaf, The Chicago Oral School, Western New York Institution, The Halifax Institution for the Deaf, and the St. John's Catholic Deaf-Mute Institute.

THE PRESIDENT:—I have received a letter from Rev. Father Trepanier, the chaplain of the Institution for the Instruction of the Deaf (Females), Montreal, Canada, signifying his intention of being present at this meeting.

And now, ladies and gentlemen, as I am sure you have had a very hard day's work and would like a little recreation, and as there seems to be no further business for the Association, I am sure we shall all be glad to be entertained by Mr. Broughton, who has kindly offered to give us a sketch ot negro life in the south.

MR. N. B. BROUGHTON. Ladies and gentlemen, I have selected for my subject, "The Educational, Social, and Religious Life of the Negroes in the South." The Colored people in our section of the country, are making rapid progress, and it would be difficult to mention any branch of knowledge to which they are not aspiring and any advantages that they do not enjoy. Christian people and philanthropists at the North have done, and are doing a great deal for the education of the Negroes in the South, but let it be remembered that the people of that section are bearing the burden for the most part. In my State taxes are levied for education without any specification as to how they shall be applied. The colored people enjoy the same advantages through the public schools that the whites enjoy. In our cities and larger towns a special tax upon

the poll and property is levied for education and what is known as graded schools are conducted for both races. North Carolina was the first State in this Union to establish an institution for the deaf and dumb and the blind of the colored people. It was built and is supported by public taxation.

Some of the ablest preachers, most eloquent orators and debaters I have ever heard are among the Negroes in our State who have received their education since the war. Possibly some of you may have heard Rev. John C. Price of Salisbury, or Rev. Mr. Grandison of Greensboro, among the most eloquent temperance advocates of this or any other country.

I commend to your reading a book recently issued by Prof. E. A. Johnson of Raleigh, N. C., entitled, "History of the Negro Race."

The social life of the Negro in the South is improving, but it has many sad phases yet. He is gregarious in his nature. The exodus movement that disturbed our labor so much in the past two years was effective because the Negroes were removed in large numbers. The South is adapted to that race because of the mild climate (Mr. Brougton gave some amusing illustrations of colored people who had left the South for the North but could not stand the absence of Negroes and the cold weather. He also told several laughable anecdotes connected with the social life of that people.)

The Negro, is a religionist, and he does not believe in forms and ceremonies, but strong, emotional experiences. Hence they are to be found as followers of the Baptists and Methodists. Gradually they are getting away from the shouting, hollering, and unusual demonstrations that characterized their services wherever assembled. But you can still find all that could be desired for a camp meeting on any Sabbath of good weather.

(The speaker graphically described a service full of interest and excitement that he witnessed in a colored church at Charleston, S. C., and sang a song called "Who'll be There When the Roll is Called," the convention joining him in the chorus.)

Mr. Broughton closed his address by a stroug appeal for the colored people, that they might be saved from their greatest enemy, strong drink, and saying for them that they were the best of all laborers for the plantations of the South and less dangerous to all our institutions than any emigrants we could bring to America.

His address was interspersed with illustrations and anecdotes all the way through, and so pleased the Convention that he was

requested to give us another on the Monday night following, but his engagements elsewhere prevented.

THE PRESIDENT: I am sure I express the wishes of the Association when I thank Mr. Broughton for the very interesting talk that he has given us on the condition of the negro in the South. I think the Secretary has some announcement to make.

MR. WESTERVELT: Mr. President, Mr. Edgar S. Werner, editor of the *Voice* Magazine would be pleased to have members of the Association write for the *Voice* Magazine. For whatever is furnished he would be glad to pay. He thinks that articles in relation to the work of teaching the deaf to speak would be of great value to the subscribers of his magazine as they are interested in all that, because there is so much effort with the deaf in teaching them to use voice. They would like to know what members of the profession have to say, what they can give to the hearing world who are interested in their work upon this and kindred subjects. Anything that you will send to Mr. Werner pertaining to our work that is acceptable for publication will be well paid for.

THE PRESIDENT: I would like to make a remark with regard to the *Voice* magazine. I am sure we are all delighted to welcome to our meeting the editor of the *Voice* magazine, the organ of communication among articulation teachers of the hearing —the elocutionists of the country. Mr. Werner has recently published a directory of elocutionists. I looked over that directory and found there some thousands of names; and it occurred to me that perhaps there we have the material from which we can draw articulation teachers. Are not elocutionists teachers of articulation? Have they not to study the mechanism of speech? They never dream, however, that their services might be of value to an institution for the deaf and dumb. Principals of institutions who want teachers for articulation rarely think of going to teachers of elocution.

Now, it has occurred to me that this Association expresses a vacuum in articulation work, a demand for articulation teachers; and this list of elocutionists containing several thousand names expresses a plenum of articulation teachers in another field. Can't we bring that plenum and that vacuum together? In that hope I have invited Mr. Werner to be present. I remember the interest Mr. Werner took in the proceedings of the third convention of articulation teachers, which were published by him at his own expense in the *Voice* magazine, and the great attention that was directed in

that magazine to our work. I am glad he is with us to-day, and I would urge him to bring to the attention of the elocutionists who are subscribers to the *Voice* magazine the wants of schools for the deaf. I would urge him especially to bring to the attention of the principals and superintendents of the numerous schools of oratory and schools of elocution in the country the great demand that exists for teachers of articulation among the deaf.

(*Adjourned until Saturday, July 4th, 9.30 a. m.*)

DISCUSSION FOLLOWING MR. LYON'S EXPLANATION OF THE MANUAL.

SATURDAY, JULY 4, 1891.—9.30 A. M.

THE PRESIDENT: A number of years ago, as you know, I was actively engaged in articulation work; and the invention that was developed from articulation work, I mean the speaking telephone, is the result of experiments to teach deaf children to speak. The telephone was introduced into America and into Europe at the same time. Now it is very curious to note the different ways in which this new thing was received on different sides of the Atlantic. It is typical of the way in which all new things are received. You go to England and no person wants it. "It is a new-fangled notion, we will wait and let some one else try it first." In America the spirit is: "This is a new thing, probably better than the old, we will try it."

This is typical of the two nations and it is just as true of educational inventions and appliances.

Now we are presented to-day at this meeting with a new invention to aid us in articulation work. What shall be our attitude towards it? Shall it be the attitude of: "We know all about articulation teaching and don't care to look at this thing. It is a manual alphabet and what have oralists to do with a manual alphabet! We want to move the tongue not the fingers."?

What shall our attitude be? Do we know everything about articulation teaching? If so, why are we here? We are here to learn. We want to consider this thing carefully. We want to see whether it has anything of value in it for our pupils. Now it is a very curious thing but it is true, nevertheless, that if you examine the manufactures of the world you will find that the

chief improvements and the most valuable improvements have come from people who are not engaged in these manufactures. The people who go into a manufacture are apt to get into a rut; and rarely go outside of that rut, until improvements come from outside.

Now we welcome to our Association to-day an outsider, a gentleman of Rochester, N. Y., in no way connected with the deaf; he has been brought to consider the subject of articulation teaching from purely philanthropic motives. That gentleman is Mr. Edmund Lyon, and he comes to us and lays his contribution upon our desk. I am sure, ladies and gentlemen, that I may say in your name that this Association welcomes Mr. Lyon to this meeting and will give a patient and attentive hearing to whatever he has to say.

[The substance of Mr. Lyon's explanation has been published in Circular of Information No. 2, and therefore is not given here.]

DR. BELL: Have you tested the Phonetic Manual sufficiently to find that deaf children can use your method?

MR. LYON: We have. We started last fall at the Rochester Institution with the three higher grades, and these practice classes had no difficulty in assuming any of the positions. Before the Christmas recess they were able to carry on conversation in the Phonetic Manual with ease. When thus using my manual the pupils associated the movement of the hands with the movement of their lips, and seemed to have their thoughts constantly directed to their vocal organs. We also found that there was a corrective element in its use. We often discovered pupils assisting and directing one another, and sometimes they referred to me in case of dispute to find out the proper pronunciation. My manual gives the child a target to aim at; he spells as he pronounces, and if he mispronounces every one sees it. This corrective element is brought into play in every-day life. Another and very important consideration is that a certain amount of manual study and practice gives the best possible knowledge of the manner in which elements are combined in spoken words.

DR. GILLETT: I am very much interested in Professor Lyon's method, and would ask him if any one has mastered it besides himself.

MR. LYON: There are thirty at least in the Rochester schoo who can use it with great ease.

DR. GILLETT : Are there any persons present that you can communicate with in this way ?

MR. LYON : Yes sir.

(Mr. Lyon then asked Mr. Westervelt's little seven-year-old son to come on the stage, and he carried on quite a lengthy conversation with him by his Phonetic Manual, the child giving correct pronunciation to whatever words or sentences he read upon Mr. Lyon's hand and changing pronunciation as the manual indicated. He showed that he was perfectly familiar with the manual and the phonetic structure of every-day language.)

MR. WESTERVELT : I should like to say that the deaf children can use the Phonetic Manual much better than my little child can. He began only a few weeks ago.

DR. WILLIAMS : How does this compare in speed with other methods ?

MR. LYON : I think it compares favorably with other methods. It should be more rapid since it is based on phonetic principles. I can spell upward of ninety words a minute, and I am by no means fast at it.

MISS HARRIETTE E. HAMILTON : I should like to call attention to the fact that the elements entering into combinations that are usually found to be easy of utterance in speech, follow one another with a similiar facility of manipulation and ease of movement when they are represented by the Phonetic Manual. There is profound scientific principle underlying this correspondence between the hand and the vocal organs in the utterance of words. The apprehension of this principle afforded the basis on which the manual was elaborated.

THE PRESIDENT : Have you any symbol to respresent a puff of air ?

MR. LYON : Yes sir.

MISS KATHARINE FLETCHER : Do you think your method is of any advantage to the deaf who do not use the old manual alphabet ? That is, does it offer anything to pure oralists ?

MR. LYON : It does most assuredly. Its greatest value is found in its power to improve articulation, pronunciation and speech-reading. It is wholly independent of and in no way connected with the old manual alphabet.

MR. WESTERVELT: I would answer Miss Fletcher: I think the highest value of a phonetic manual is in an oral school ; it gives children the power to converse in speech much more readily discernible than the speech of the deaf. The classes who have been taught the

Phonetic Manual the past year are not the only ones in our school who have used it. Some of the other pupils complained that they could not understand what was said in the conversation of the upper grade pupils, who enjoyed the exclusion of their intercourse, and they were compelled in self defense to learn the manual, and those who mastered it found great satisfaction in its use.

QUESTION: Can the Phonetic Manual be used in representing other than English sounds?

MR. LYON: After a child has mastered the Phonetic Manual in representing English sounds he has very little difficulty in acquiring foreign words. A few days before school ended, I asked Miss Hamilton if she would permit me to take a pupil and experiment with him at school exhibition, on foreign sounds, such as the French trilled *r* and orinasals, and German *ch*. A few minutes of instruction, given entirely through the Phonetic Manual, enabled him to do all I wished. He had never been taught to trill, or to speak a foreign word ; yet without manipulation I taught him to say "*ich liebe dich*" and "*parlez vous français.*" He pronounced these sentences so that a foreigner could understand him. Subsequently other scholars were experimented with, and in some cases less than five minutes instruction through the manual enabled them to prononnce "*ich liebe dich*" intelligibly. The words "*ausgespielt*" and "*gebracht*" were correctly pronounced at sight.

MISS ELIZA KENT : Do they articulate more freely ?

MISS HAMILTON : I think it has a corrective element in the school, not alone in the teacher's use of it, but among the pupils themselves. The older pupils who have studied Professor Bell's system of Visible Speech and who are familiar with its analysis of positions and speak correctly, understanding how words should be phonetically spelled, have unconsciously aided the younger children in speaking.

THE PRESIDENT : Will you also answer that question, Mr. Westervelt ?

MR. WESTERVELT : The articulation of individual words, with which pupils have difficulty, has been improved through the use of this manual. When, however, it becomes acclimated and all are accustomed to its use, we shall see more marked results and be better able to speak from experience of the effect of free intercourse through Visible Speech upon the articulation of a school.

MISS ADA R. KING : How did this affect spelling ?

MR. LYON : It did not seem to interfere or conflict with orthographic spelling.

MR. WESTERVELT : There can be no question but that the use of a phonetic manual, while it will promote the acquisition of fluent and correct speech, will not have the same effect upon spelling. But if it is used, as Dr. Bell has emphasized that Visible Speeh should be used, without regard to the letters of the Roman alphabet, or to the orthographic form of words, but as a pictorial presentation and direction for such action of the vocal organs as produces speech, it need have no relation to ordinary spelling or to writing any more than has the speech of the hearing.

DR. FAY : Are any of your pupils gaining a vernacular use of Mr. Lyon's alphabet, remarkable as it evidently is for the rapidity of its execution ?

MR. WESTERVELT : They use it quite freely and constantly.

DR. FAY : Do they seem to think with it ? This is the crucial test of all experiments, with the deaf as well as with the hearing.

MR. WESTERVELT : Many of the pupils use the manual with rapidity and ease in their ordinary conversation, seemingly unconscious of the vehicle in which they present their thought. They have that automatic freedom which does not require thought or attention. They think in speech and the hand gives exact expression to the utterance of the mind, having difficulty in uttering by the hand such words only as they are not familiar with and lack confidence to speak.

MR. CROUTER : I would like to ask Mr. Lyon whether or not this alphabet will interfere to any considerable extent with speech or lip-reading ?

MR. LYON: I think it will have a beneficial effect. Lip-reading is something the deaf are obliged to resort to and that they can be constantly practiced in. Every hearing person they meet speaks. It is constantly before them. When they are reading the lips of their playmates they are often reading malformed vocal positions. Deaf children as a rule do not take positions as we do. In their effort to imitate they exaggerate, and they learn to mispronounce words from each other. If the manual should interfere to a slight extent with that kind of lip-reading there would be ample compensation, since the use of my method would fix in their minds a knowledge of the way words should be spoken.

A mastery of the manual will assist the child in recalling the correct phonetic analysis of the words which comprise his vocabulary. I cannot conceive it possible otherwise for any deaf child to remember the pronunciation of three to twenty thousand words or more.

MR. CROUTER: Mr. Westervelt said, as I understood, that this phonetic manual is used by some of the pupils in his school to the exclusion of the manual alphabet.

MR. WESTERVELT: Oh, no, I did not mean to be so understood, though there are some of the pupils who use it freely. Miss True has asked me to say that after visiting the schoolrooms and seeing the work of the phonetic manual in the classes, it is her judgment that it is in every way beneficial to deaf children that they should in their intercourse with one another use the phonetic manual. She also thinks with me that it makes them critical of one another's mistakes, and in this way helps to establish them in correct habits of speech.

MR. CROUTER: Do I understand you to say that it is Miss True's judgment that orally taught children should communicate with this manual?

MISS TRUE: I am not prepared to make a recommendation that would be so subversive of existing methods. The Rochester school has not yet demonstrated all that this manual can do. I do think that one deaf child can observe another deaf child's mistakes on the fingers, and can criticise and so assist in the advancement of other deaf children as they cannot in oral intercourse. From what I have seen the benefits of the manual have been most manifest. I have not seen what disadvantages can come of its use. I should say it would be of very great benefit to children if their teachers were to use the Phonetic Manual with them as a medium for recitation and classroom work. Little deaf children can spell what they want to say on their fingers long before they are able to speak correctly. Why would it not be advantageous to them to practise phonetics on the fingers, so that when the time comes they will be ready to speak correctly?

MR. CROUTER: Why can't they practise speaking just as well by using the vocal organs as by using their fingers?

MISS TRUE: Because a little child cannot see the action of the vocal organs as plainly as it can the action of the hand. It can become familiar with positions by the action of the fingers and can practise and practise through conversation until the time comes when, having had voice training, they can speak readily and fluently the words that they have become familiar with through practice on the hand.

MISS BLACK: I do not think it would help my children. I want them to use the elementary sounds as they are represented by

the dictionaries, and as represented to hearing children. I want to accustom them to the ways of hearing people in school so that they can talk to hearing people out of school.

MR. BINNER : I should like to ask if correctness of speech goes with correctness of phonetic spelling? What I mean to say is, when a child takes the manual position for *ōō* or *th*, will the child take that position with the lips? Now I think Mr. Westervelt could tell us something about that.

MR. WESTERVELT: Yes, certainly, if the child has been trained to do so. Through training, which is simple and easily given, the vocal organs and the hand act together. When attention is directed by the manual to successive vocal positions the vocal organs themselves move as the hand directs, and not only is this true but the deaf in the use of the manual almost always take the position for the *ōō* or *th* with the vocal organs before they give them with the manual. Pupils who are familiar with the Lyon Manual frequently correct their own mispronunciation by observing the phonetic presentation of the entire word on their own hands. The hand does not present fragmentary intermittent speech as the lips do. It gives all the positions, presenting the word whole to the sight of the deaf child as it is in sound presented to the hearing.

Miss True says she would recommend the use of the Phonetic Manual among those who hear. I should hardly recommend it as having as great advantage for the hearing as for the deaf.

DR. GILLETT : Why not?

MR. WESTERVELT: Because the Phonetic Manual is designed to enable the deaf child to use his eyes so that they take the place which the ears fill satisfactorily for the hearing. When the deaf are gathered together, as they are in a school, it is an advantage to them to have a handy Visible Speech manual showing distinctly the positions which the vocal organs take in speech; easy to use, easy to see even across a room. Manual intercourse in this way teaches the deaf exactness in speech. It would be an interesting exercise undoubtedly for the hearing, teaching them phonetic analysis as an exercise in Visible Speech, but I should never have thought of devising or trying to get any one to devise a phonetic manual for their use.

DR. FAY : In the intercourse of pupils who cannot speak freely and who have not a sufficient knowledge of the phonetic alphabet, or of any other, to use alphabetic language in their intercourse with each other, would you allow them to use natural action?

MR. WESTERVELT: I should not. If I see children trying to say something through natural action I know they will be glad to have the English expression for their thought, and I give it to them.

DR. FAY: Would you prefer, in that case, that they would not communicate at all?

MR. WESTERVELT: Pupils in the lowest class in the kindergarten are able to communicate in English, if they have anything to say.

DR. FAY: My question was: in case of pupils who have no ability to speak freely and perhaps no acquaintance with the Phonetic Manual, but an insufficient use of our own alphabet; when they wish to communicate with each other, would you allow them to communicate by natural action?

MR. WESTERVELT: Most certainly; but I should give them English words and see that they at once began to acquire a sufficient use of a manual. I should not allow them to use natural action as a habitual means of intercourse.

PROF. GORDON: I don't propose to enter into this discussion, but I rise to say that though I have not the extensive knowledge which would enable me to fully understand Mr. Lyon's very interesting explanation of his method, I did endeavor to follow it, although at times I could only see the flapping of his coat tails in the distance. I must say that I was very much impressed with the explanation he has given of his system. It certainly shows very great ingenuity. It must have involved an enormous amount of labor, and it is probably the high-water mark of efforts in this direction.

Of course this thing has been attempted before, but it was never perfected. Long, long ago Péreire, who antedated the Abbe De l'Epee, made use of some sort of a phonetic manual, and his two distinguished pupils, who were exhibited before the French Academy in 1749, 1751, made attainments in knowledge and culture which have never been surpassed. What his phonetic alphabet was, is not known. A copy was deposited in the Paris Institution in 1825, but all efforts to discover it have been in vain.

Coming down still later Charles Wilhorgue of Rouen, an advocate, not connected with the profession at all, but having a knowledge of stenography, endeavored to help the deaf and dumb by designing a phonetic alphabet. I think there are cuts of that alphabet

in existence.* Still later, about 1865 I believe, Grosselin, who was a stenographer in Paris and not connected with the profession of deaf-mute instruction in any way, also attempted a system of "phonomimics," and schools were organized in France for the express purpose of introducing this system, but without material success. In Grosselin's system, instead of attempting an alphabet such as we have here or an alphabet upon the fingers, gestures were used for the phonetic elements, and in some cases there was a supposed natural connection between the gesture and the sound to be indicated, the purpose being to make it more significant to the pupil. Another feature of that system was that these gestures were made near the face. The idea was, that by making them near the face, the gaze of the reader would be fixed upon the lips and yet be able to take in the gesture at the same time.

THE PRESIDENT: You mean the system of Grosselin, which is called *phono-mimie?*

PROF. GORDON: Yes. It has occurred to me that some of the positions required by Mr. Lyon's manual are a little difficult to make with rapidity. While there may be serious objections to using any phonetic alphabet it is quite evident that such an alphabet might be used as a valuable auxiliary in teaching speech-reading, and it is possible that some one may devise a phonetic alphabet employing both hands which might be easier to read correctly with speech than the one just exhibited. It has occurred to me one could take as a basis the left hand to work upon, and by designating arbitrarily selected points with the fingers of the right hand, one could readily have all the positions needed. These points are easily visible and easily pointed out.

(Prof. Gordon here gave a brief description of this suggestion.)

DR. GILLETT: Have you found any persons who found your system difficult to learn, Mr. Lyon?

MR. LYON: Some persons acquire it much more easily than others do, but no one has been obliged to abandon it because of its difficulties.

* Wilhorgue styled his alphabet (1847) *Dactylographie ou Stenographie des Doigts.* An examination of the plates shows that on one side of the hand and fingers the simple Dalgarno alphabet was indicated, while on the other, points were taken to indicate twenty-three of the most common terminations in the French language.

The only phonetic alphabet actually used in an institution for the deaf in France, as an aid in teaching speech, was employed at Poitiers by the Brothers of St. Gabriel and attributed (1857) to Fr Bernard. The claim was made for this system of "phonodactylologie" that it was six or seven times as rapid as writing, and that it, beyond question, aided in spontaneity of speech on the part of the pupils.- -J. C. G.

DR. GILLETT: There is a question which some might ask as to whether the possession of this knowledge interferes with certain other kinds of knowledge; this *quasi* objection has no force, as my observation has been that the more one knows of one thing the more he is likely to know of other things; that all knowledge is stimulating.

THE PRESIDENT: I look with very great interest upon this development by Mr. Lyon. It is too soon to criticise it. We must understand it first and see it tried; and in the meantime let us give it a welcome as a new thing. I have had a great deal to do with inventions and I can appreciate the marvelous inventive ability of our friend, Mr. Lyon. Prof. Gordon has given us a little account of previous attempts to form phonetic manual alphabets, but he has omitted two of them. More than fifteen years ago my father and I both attempted to devise a Visible Speech manual alphabet, but it was never perfected or taught to others. I am, therefore, prepared to appreciate, as no one else here can do, the marvelous ingenuity of Mr. Lyon in providing manual positions for all the various symbols to be represented.

And now as to the value of the idea. I look upon this alphabet as a germ of the very greatest importance in articulation teaching. It is meeting a want I have long felt. When we talk to a deaf child, he fails to see many of the positions upon which good speech depends, although he sees enough to catch the meaning of what we say. He perceives only a blurred outline of the pronunciation.

In Germany and Italy where oral methods are most successful, the written languages are phonetic; and deaf children have, in addition to speech-reading, a vast literature in which the words are spelled as they are pronounced. In the ordinary books and newspapers of the country, the picture of the correct pronunciation is impressed upon their minds with a distinctness which is not obtainable from the mouth. The mouth only recalls it, suggests it; but in the printed book they have the perfect picture itself. "The target for which the child aims," as Mr. Lyon puts it, is clearly in the mind of the German and Italian child. But in English-speaking countries it is not so. Our spelling is unphonetic and irregular, so as to be misleading in matters of pronunciation.

How can we teach good articulation to a deaf child unless he is accustomed to see correct speech, as others hear it? A child is a careless creature. He must have the correct pronunciation presented

to him not once or twice, but hundreds of times before he remembers and imitates it. A phonetical manual alphabet is a good idea. It may do for our pupils what phonetical drilling does for the German or Italian child. It is probable that like most inventions it appears first in its most complicated form and will become simpler as developed. But there is another advantage in the Lyon Manual. Through its agency it is possible to spell the incorrect pronunciation of pupils, so that deaf children may be shown their own defective speech as other children perceive their defects through the ear. There is a corrective element here of the greatest value.

I believe, ladies and gentlemen, that the introduction of this alphabet, whether it lives or whether it dies, marks an epoch in the history of articulation teaching in America. And whatever may be its fate, it has already been of value to us and our pupils, for it has been the means of bringing into our work a man of exceptional ability. I know a good many of the articulation teachers of this country, but I don't know anyone in America who has natural abilities for articulation work comparable to Mr. Lyon. I trust he will keep up his interest in the deaf, and not desert the work. I am glad that he has an opportunity in one of the schools of the country to show us practically what this alphabet can do. I am sure nothing but good can result from the development of it.

MR. LYON: I should like to express my deep acknowledgment of the very warm and kind words of the President, and also to thank you, ladies and gentlemen, for the attentive hearing you have given me.

THE PRESIDENT: I have forgotten one point. I have neglected to allude to another attempt at a phonetic alphabet. You all know that a few years ago I had an experimental school in Washington, in which we were trying various devices, and the last thing developed in that school was a phonetic alphabet of a novel character. It has not yet been thoroughly tested. We termed it "the shoulder alphabet;" the letters were located upon the shoulder of the pupil, and were read by the sense of touch while he looked at the mouth of the speaker.

MR. WESTERVELT: I should like to add a word in relation to Visible Speech to which the Lyon Phonetic Manual is auxiliary. We need some way to give the pupils of our schools quantities of Visible Speech or other phonetically written or printed matter, in which words will be presented to the eye in correct phonetic form. Visible Speech is somewhat difficult to write. In order to make the

preparation of schoolroom phonetic exercises practicable and convenient, we want a typewriter. I have been for some time negotiating and corresponding with typewriter companies, but before the plans for the arrangement of a key-board and the selection of characters were finished, the Remington Typewriter Company made one off-hand, which they have sent here and which they are willing to perfect and to make entirely satisfactory. They invite suggestions and hope soon to have it on sale, so that any school that wants a phonetic typewriting machine can get it from Wyckoff, Seamans & Benedict.

Through the generous courtesy of Dr. Bell, the members of the Association with their friends enjoyed a charming excursion on the Lake in the afternoon. The steamer left the Crosbyside wharf shortly after dinner and returned at sunset.

In the early part of the evening there was a display of fireworks under the supervision of Mr. Fechheimer.

Later in the evening a banquet was served in the spacious dining-room of the hotel. The Entertainment Committee were exceedingly fortunate in securing, as master of ceremonies, Dr. Gillett, whose address was listened to by all with the utmost pleasure. Dr. Bell and Dr. Wines spoke in response to toasts. It is a matter of sincere regret that the speeches were not reported in full, as they were well worthy of preservation.

Before the close of the entertainment Mr. Crouter expressed the sentiments of the members present by moving a vote of thanks to Dr. Bell for the pleasure of the afternoon, and to the proprietors of the hotel for the evening's banquet.

(*Adjourned until half-past nine o'clock Monday morning.*)

ADDRESS BY REV. DR. WINES.

SUNDAY JULY 5, 1891.—8 P. M.

MR. WESTERVELT: I take pleasure in introducing the Rev. Dr. Frederick H. Wines, who has a proposition to lay before the Board of Directors. As the proposition will doubtless interest all members of the Association he has been requested to submit it at this time.

REV. DR. WINES: The National Conference of Charities regrets that for some years past the teachers of the deaf have been indisposed to attend the annnal sessions of that body. Five years ago, in St. Paul, Dr. G. O. Fay read a paper on the education of the deaf and dumb. We have not had one since. Now, the Conference of Charities furnishes a free platform from which any man or woman may speak. It is a sort of philanthropic Chautauqua, where everybody who is interested in the subject can learn how the various classes of persons for whose care and training or treatment special provision is made by the State, are and ought to be cared for. The nucleus of the organization is found in the State Boards of Public Charities, which now extend in an almost unbroken line from Massachusetts to California. But it is regularly attended also by representatives of the charity organization societies in the larger cities, who have to deal with the question of handling the waste material which accumulates in them, and it is open to anybody and everybody who represents any charitable institution or association, or who is interested in any phase of the subject whatever.

It seems to me that this conference affords a great opportunity to the teachers of the deaf to bring their work to the notice of a sympathetic audience, a picked audience, of men and women anxious to lift up humanity, who have both social and political influence, and who are in a manner the confidential advisers of governors and legislatures. Failure on your part to be represented there

appears to me to involve a great loss to the deaf and to yourselves as the guardians of their special interests. But the feeling that we discuss methods of caring for other classes, not on the same intellectual or moral plane with the deaf, no doubt influenced your decision to withdraw from association with us. I feel, therefore, that in bringing this proposition to your attention I am treading on somewhat dangerous ground.

When the National Conference of Charities met in Baltimore, a year ago, the President of the Illinois State Board of Charities extended an invitation to that body to hold its annual meeting in 1893 at Chicago, which was accepted. It was further stated, at our Baltimore meeting, that an International Congress of Charities had been held in connection with the Paris Exposition, and that a desire had there been expressed to meet in the United States on the occasion of our World's Fair. The National Conference was asked to invite the International Conference to meet with it in Chicago, which was agreed to, and a committee of fifteen was appointed to bring this invitation to the attention of the authorities in charge of the exposition, and to ask whether they would favor and provide for an international exhibit of the methods, appliances, and results of charitable and correctional work throughout the world.

We need to show the Europeans who will come to this country in great numbers that their conception of us as a purely commercial nation, interested in nothing but material progress and development, is a misconception. Many Europeans do not know that we have any higher aim in life. Not only will the Columbian Exposition be a great opportunity for us to instruct our own people, but we will present ourselves to Europeans in a much more favorable light, if we can show them that we have a soul above these merely material interests. And if we can get similar exhibits from Europe, they will be very interesting and suggestive to our own people.

Well, we went before the authorities of the World's Fair and presented our case. They listened courteously, and said that they would provide for the proposed exhibit. The World's Fair proper has nothing to do with Congresses; but, in connection with it, there has been organized what is known as the World's Congress Auxiliary appointed for the propose of getting as many international congresses to come to the World's Fair as possible. A large building will be erected for the accommodation of these congresses, and the World's Congress Auxiliary has promised us that every facility

shall be given for the meeting of our International Congress of Charities and Corrections.

At the Conference of Charities at Indianapolis, this year, a committee was appointed to prepare the way for the organization of this congress. That committee is also to see what can be done toward the selection of topics for discussion, and of speakers to discuss them, and to report to the Conference of Charities next year at Denver. I am chairman of the committee. The first thing to be done is to fix a date for the International Congress which I think should be in July. My idea is to set apart two weeks for this meeting, in order that time enough may be given those in attendance on it to see the World's Fair. The Congress should meet in sections according to the subjects to be considered, and all branches of benevolent work should be represented in it. In order to make it a success, the co-operation of all the various organizations of this country who are interested in any phase of benevolent work whatever must be secured, including humane societies and societies for the prevention of cruelty to children or to animals. I think each group of organizations devoted to any special branch of the general work should be organized in a separate section.

The World's Fair people will publish the proceedings in a series of volumes,—a sort of encyclopedia or small library. We have a man selected to take charge of the exhibit, who is to be paid out of the funds of the exposition, and who is to conduct the necessary correspondence.

I came here to lay this matter before the Executive Committee of this Association, and to say to them that, while we do not want to urge them to take any action contrary to their convictions, we shall be very glad indeed, if it can be so arranged that the teachers of the deaf will take part with us in working up this great convention. I want to suggest to your minds this thought: that, while you meet from year to year with the American Educational Association, that is such an immense gathering, that you are really overwhelmed and lost in their meetings. Alone, or as a part of the great International Educational Congress, you will hardly make a ripple; but if you accept our invitation you will attract the attention which the great importance of your work deserves.

MR. CROUTER: Do you think that other work of a similar character will be represented.

DR. WINES: That is our hope.

DR. GILLETT: The Convention will meet in Chicago in 1893; and all the members of this Association are also members of the Convention, and they would scarcely care to have two exhibits to look after at once.

DR. WINES: What I propose is, that the Quadrennial Convention, if that meets in Chicago, shall organize a section of this International Congress, and take charge of the work of that section.

DR. GILLETT: That would have to be decided by the Convention itself. I think the desire would be to co-operate with the International Congress as far as possible.

MR. CROUTER: Is there to be an invitation to the schools to send exhibits?

DR. WINES: Yes, sir.

MR. CROUTER: Will that be separate?

DR. WINES: Yes, it will be a separate branch of a larger exhibit, which include much beside.

MR. CROUTER: The National Conference of Charities will co-operate in the organization of this exhibit?

DR. WINES: It will co-operate in the organization both of the Congress and of the exhibit. It will not take charge of the exhibit. That will be under the charge of the superintendent of the department of education and the liberal arts; but it is agreed that the National Conference of Charities shall work in connection with the auxiliary committee, and aid in arranging for both. The exhibit of the methods, appliances, and results of teaching the deaf will not be mixed up with any other exhibit.

MR. CROUTER: Is there to be one general exhibit of the work of the institutions of the deaf?

DR. WINES: Yes, a general exhibit.

MR. CROUTER: Can the various institutions elect, instead of sending their exhibits as part of a state exhibit, to send them direct to a general exhibition of work among the deaf from all parts of the world?

DR. WINES: Yes, if the state governments do not forbid that.

DR. GILLETT: We will have an exhibit from our institution, and the state legislature having made an appropriation of $80,000 for that purpose, it is proposed to take a hundred pupils there. I would like to know the opinion of the Association on that subject.

DR. WINES: I think, if you can get picked pupils and exhibit them, that it will be very desirable to do so.

DR. GILLETT: Well, it is a question whether that would be an honest exhibit. What I propose is to take representative grades.

MR. WESTERVELT: I do not think that we can take decisive action at this time upon the proposition of Dr. Wines, since we have not planned to go to Chicago independently as an Association; but expect to go as a section of the Quadrennial Convention of the American Teachers of the Deaf.

DR. WINES: I don't ask you to decide anything just now; I merely want to explain our plans.

MR. WESTERVELT: The members of this Association will take part in the Convention of Teachers of the Deaf which will meet in Chicago with the purpose to make it in every way successful.

DR. WINES: I can say that the Director-General of the Columbian Exposition will do all he can to help you, whatever form or relation your participation in it may assume.

DR. GILLETT: Our section of that Committee will meet at Colorado Springs next year, and we can then decide what we shall do.

DR. WINES: But something should be done now; we can't wait until next year. There is a great deal to do in the way of preparation, and very little time to be lost.

DR. GILLETT: We will have to have a special meeting of the Executive Committee, then, to decide it. We can't decide it here.

MR. WESTERVELT: Would it be well for this Association to make some recommendation of the Convention, to the Executive Committee in accord with Dr. Wines' presentation of this matter?

MR. CROUTER: We would rather talk the matter over first.

DR. GILLETT: I think the Executive Committee should decide.

MR. WESTERVELT: But that will not meet until next year.

MISS YALE: I think there should be a special meeting of the Committee, if this is to be decided upon.

DR. GILLETT: I move a vote of thanks to Dr. Wines for his presence here and his suggestions.

The vote of thanks was passed unanimously, and the meeting then adjourned.

HISTORY AND DEVELOPMENT OF ARTICULATION TEACHING IN AMERICA.

MONDAY MORNING, JULY 6, 1891.—9 A. M.

The PRESIDENT: The next lecture on our programme is a lecture on the "History and Devolopment of Articulation teaching in America," by Miss Yale.

MISS YALE: Articulation teaching is old while America is new. We must, therefore, find our starting point in Old World times and places, and indeed, it is wise always in studying the history of any period to begin at a point so remote from that period, both in time and place, as to insure a clear setting for important epochs and events.

All early efforts in behalf of the deaf were those put forth by individuals for individuals. The miracles of the Gospel records are certainly such. The report by the Venerable Bede of what he deemed a miracle in his own time, and the record of Rodophus Agricola, which were considered fabulous, a century later, are both the records of such individual efforts to give speech. Agricola wrote that he had seen "a man deaf from his earliest years, and consequently mute, who nevertheless had so learned that he understood whatever another wrote, and himself also knew how to speak, and that he could reveal all the thoughts of his mind."

The real history of deaf-mute instruction must be considered as dating from the Reformation. Luther claimed that saving grace was for the deaf and dumb as well as for hearing persons; that the deaf-born are not without reasonable souls and, that the Saviour, by his miracles in their behalf, indicated God's intentions of mercy toward them.

In the middle of the 16th century, Pedro de Ponce appears in Spain, as an *instructor* of the deaf. Of him it is written that "He

enabled those who were deaf and dumb from birth to speak, teaching them first to write the names of objects, then directing their attention to the objects themselves; and finally instructing them to repeat with their own vocal organs the words they had written. His own record of his work is, "With the industry which God has been pleased to give me, I have had pupils who were deaf and dumb from birth—children of great nobles and men of distinction—whom I have taught to speak, to read, to write, and to keep accounts, to repeat prayers, to serve the mass, and to confess themselves with the living voice." Of this good brother, this record is still preserved in the monastery where he lies buried. "Anno Dominie 1584, in the month of August, Brother Pedro Ponce fell asleep in the Lord. He was a benefactor of this house, illustrious for his virtues; but his crowning excellence, and that which gained him a deserved renown throughout the world was his teaching the dumb to speak."

In 1620, Bonet, a countryman of this good brother, published a book entitled, "The Art of Teaching the Dumb to Speak," in which he sets forth that he, himself, used natural signs and a manual alphabet in the beginning of a child's instruction, but depended mainly on articulation and lip-reading. We fail, however, to find his method so remarkable as the Abbe de l'Epée's allusion to it would indicate. He says: "To instruct the deaf and dumb how to dispose their organs in order to express sounds and to form distinct words, is an operation which most certainly is *neither long* nor *painful*. Three or four lessons do greatly advance this business, if not accomplish it fully, (by following the method of Mr. Bonet, a Spaniard, printed one hundred and fifty years ago). The business is nothing more than to make them acquire the practice of it; and that does not regard me. That is the affair of the persons who dwell with them, or of a common master who teaches children to read."

The modern history of this subject begins two hundred years later, when Heinicke De l'Epée and Braidwood appear in Germany, France and Great Britain, as founders of schools, and promulgators of differing systems of instruction for the deaf. The present century has marked greatest achievements in this, as in all other educational and philanthropic work. In America, indeed, nothing had been done previous to this time. The knowledge of what was being done in other countries had reached our shores, and possibly more than one child had been taken across the sea to receive the instruction; no one was as yet, prepared to give it at home. We find the record of a lad, Charles Green, a native of Massachusetts, whose father placed

him under the care of the Braidwoods in Edinburgh, in 1780. The following extract from a book published by his father soon after, may be of interest here :

"My visit to him was in May, 1781. It exceeds the power of words to convey any idea of the sensations experienced at this interview. The child, ambitious to manifest his acquisition, eagerly advanced, and addressed me with a distinct saluation of speech. He also made several inquiries in short sentences. I then delivered him a letter from his sister (couched in the simplest terms), which he read so as to be understood. He accompanied many of the words, as he pronounced them, with proper gestures, significative of their meaning, such as in the sentence, 'write a letter by papa'; on uttering the first word, he described the action of writing by a motion of his right hand; the second, by tapping the letter he held; the third, by pointing to me. He could at that time repeat the Lord's Prayer very properly, and some other forms, one of which, in particular (which I had never heard before), I then took down in writing from his repetition, a convincing proof of his speaking intelligibly. I found he could in a short time read distinctly, in a slow manner, any English book, although it cannot be supposed he had as yet learned the meaning of many words. He, however, made daily progress in that knowledge. As to writing, there can be no reason why deaf persons may not, by imitation, learn that art as well as any other persons; accordingly, I was not at all surprised that he could write very plainly; this, indeed, he did with uncommon readiness and dexterity, and seemed not a little proud of all his new attainments. I had also the satisfaction to see such specimens, at that time, in the proficiency of others who had been longer at this academy, as left no doubt in my mind of his acquiring, in due season, a perfect acquaintance with language, both oral and written. * * * * On my next visit in September, 1782, his improvements were very perceptible in speech, the construction of language, and in writing; he had made a good beginning in arithmetic, and surprising progress in the arts of drawing and painting. I found him capable of not only comparing ideas, and drawing inferences, but expressing his sentiments with judgment."

We find also a record of some brief period of instruction for two children in Virginia by a member of this same Braidwood family Dr. Edward Gallaudet, in his life of his father, alludes to a publication of the Abbé Sicard's, from which the elder Gallaudet gathered hints for his first work with Alice Cogswell, adding: "This success

encouraged her father in the hope that, instead of sending his child, made more dear to him by her privations, away from home, to Edinburgh or London for instruction in the schools of Rev. R. Rinniburgh or Dr. Watson, a school might be opened in Hartford." While in England Mr. Gallaudet wrote back, alluding to his difficulty in gaining satisfactory knowledge of the English system of instruction, "I yet hope to combine the peculiar advantages of both French and English modes of instruction. For there are considerable differences between them." In 1817, the school at Hartford was opened, and the following year the one on Washington Heights, N. Y. Other schools were opened in the South and West, but in them all the French system was the one employed.

Scattered cases of Oral Method teaching as applied to deaf persons who retained speech more or less perfect are not very rare. Mr. Turner states that during the ten years that he was principal of the institution (at Hartford), he employed "a teacher in articulation whose sole business it was to teach these semi-mutes." He adds that they "never attempted anything farther with congenital mutes, but these semi-mutes were taught at regular hours each day." We know that some other efforts were made in this direction both in the school at Hartford and in other schools, but they are not reported as permanent nor general.

The interest excited by reports of Horace Mann and Dr. Samuel G. Howe of Massachusetts and of gentlemen sent out from the Hartford and New York schools was a means of spreading a knowledge of systems of deaf-mute instruction. With little or no knowledge of these discussions the experiment of teaching the deaf to speak had already been carried on in New England.

In 1830 Jonathan Whipple, of Ledyard, Connecticut, taught his own son and also several other boys to speak and to read from the lips. The following letter written by Mr. Whipple gives in his own quaint way his experience and convictions:—

"The fourth day of last December a man came to my house, bringing with him a deaf son, wishing me to make a trial with him, to see whether I could teach him to talk as I had my son Enoch. I never had seen him but once before. Two years previous we were called on by this man to butcher a hog, Enoch being with me; and he, seeing that his son could hear quite as well as Enoch, and yet was a mute, it set him to thinking, and he thought upon it for two years, and then came with his son. I kept him 105 days, and in this time he made so much of an improvement that he could call off the alphabet in a perfect manner, could say almost any word quite plain, could spell many words, such as house, barn, tree, rock, stone, etc. He was 21 years old the 15th of last February. It is my candid conviction that there are but very few of the deaf who could not be taught to talk, if they were properly managed with. I

have found but very few mutes who can hear *none;* almost all of them can hear *some.* All of us who reflect at all upon the subject, know that every deaf person or child has the same organs for talking that those who have hear, and the only reason why they do no use them with the same success is because they don't know how. Now, this is the whole difficulty—*they don't know how.* Now, we all know that every letter, and every word that is spoken, and spoken *plain*, takes the *same* operation of the mouth and lips. Now, this is the question : 'Cannot the deaf be taught this art of using their mouth and lips as people who talk do?' I think the most of them can, only commence with them at a suitable age, and manage with them in a proper manner. There might be some few of them, who could hear *none at all*, and who were stupid and dull, that could not be taught to talk. This young man that has been with me could hear some, but not enough to learn to talk. He could convey nothing by language, as he was master of none. He did not ask to *hear*, but 'I want to see the mouth' he would say ; but when he came to my house he did not know that he had a mouth, (by name,) or a head, eye, nose, or any other member. It looks to me like a great pity that this way of teaching the deaf could not have a fair trial. When this young man left me he could (by observing my mouth,) read off the whole alphabet, let me commence wherever I might, not missing a single letter ; and it was the same with any word he had learned—only mouth it out, not making *any* noise, and he would know it just as soon as any person knows by hearing.

"Now, my son Enoch don't think of *hearing* people when they talk, but depends on *seeing* their mouths."

It has been objected that this honest old man in teaching his son, was not teaching a totally deaf child. Very true. He distinctly states that; but every teacher of speech to the deaf. knows that partial hearing does not remove all necessity for patient repetition of every elementary instruction, In a private letter, he said, in regard to these accusations: "Now, I would just ask, if it would look anyways probable, that a child that could hear 'very well,' would be selected out from the other children and labored with for years, in order that they might read language from the lips, and he hearing 'very well,' all the time." It is plain that these deaf boys needed special teaching, such teaching, as at that time, Mr. Whipple judged, no school was prepared to give them.

* "In the fall of 1864, Miss Harriet B. Rogers, took under her care, a deaf-mute child, intending to teach it by means of articulation and lip-reading. This, she knew had been done in Germany, though she had not learned the details of the system employed there. As the needs of her pupil demanded, she fashioned a system of her own, which, as later comparison showed, had many points of resemblance to the German method. She proposed also, to allow the child to employ the manual alphabet at first, in the use of words which she could not articulate. A brief trial of this combined method con-

* We have repeated here, our account of Miss Roger's early work previously published elsewhere, as it has been approved by her.

vinced Miss Rogers of the impossibility of attaining complete success in articulation and lip-reading, unless these were employed as the sole means of communication; for the pupil, during his early instruction, finding it more difficult to read words from the lips than from the fingers, was in danger of becoming dependent on the later rather than the former, and thus would be content with that which was intended only as an aid to the higher attainment of lip-reading. She therefore abandoned the manual alphabet, and retained only articulation and lip-reading; and the result exceeded her expectations. Encouraged in her success by the favorable opinions of several leading educators in Boston, she made further trial of this method with seven other pupils, three of whom were congenitally deaf.

In 1867, Miss Rogers was invited to take charge of the institution, which, in October of that year, was opened in Northampton. She accepted the invitation, bringing to it her former pupils, and with them the system employed by her in the school at Chelmsford, which was the exclusive use of speech, lip-reading and writing, as means of instruction, without the manual alphabet or signs, except such natural signs as are used with all children.

About the same time that Miss Rogers began her work, Mr. Engelsman, who had received training in a celebrated school in Vienna, arrived in New York, and engaged in teaching a few private pupils articulation and lip-reading. In 1867, the Association for the Improved Instruction of Deaf-Mutes, was organized and the little school of Mr. Engelsman became the nucleus of the present thriving institution under the care of Mr. Greenburger, on Lexington Avenue.

It has, therefore, been impossible, in this sketch, to separate the method of articulation teaching from the thing taught. Speech was taught by speech, often, no doubt, without thought of the method, believing that the way to learn to do a thing is often best found in the doing of it. The organization of these two institutions, the one in New York, and the other in Northampton, of the Horace Mann School in Boston, two years later; the establishment of articulation classes, and of still other oral system schools, made far more general the knowledge of ways and means used in the accomplishment of the desired result, the teaching of speech and lip-reading to the deaf. Three distinct methods of doing this work, have, for the past few years, been clearly defined. These are known as the Element, Syllable and Word methods. Later the Aural method was added.

The first of these is the one usually spoken of as the German method. Under it the elementary sounds of the language are taught as positions, syllables and words as combinations of these. The elementary sounds of the language are in many schools represented by the letters of the alphabet modified, when necessary, by diacritical marks. Miss Worcester, the special teacher of articulation in Clarke Institution for many years, arranged charts of the vowels and consonants in which she indicated the sound of each important element as determined by its position in words. The pamphlet "Pronunciation at Sight," gives her own explanation of these charts. Miss Fuller, principal of the Horace Mann School, has since arranged a set of charts with key words.

Visible Speech is the most scientific attempt that has been made to devise characters which should represent each elementary sound by representing the position necessary to produce it. Whipple's Natural Alphabet, is in some respects, more pictorial than Visible Speech, but its symbols are much more complex. Diagrams of the organs in positions for sounds are most invaluable aids in the school room, but these form a very cumbersome alphabet for common use. All peculiar representations of sounds have the disadvantage of belonging only to the narrow literature of the profession, not being found in the printed books in use by the rest of the world. They are valuable for the teacher, but must for the pupil, always, in the end, be translated into the ordinary characters of print and script.

A combination of the Word and Syllable methods has been employed by various teachers. The importance of a syllabic drill being emphasized by some and ignored by others. The Word method has been used for some years in the New York institution of which Mr. Greenberger is the principal. We quote in regard to it from the Eighteenth Annual Report of that school: "We should make our first lessons in articulation conform to the course of nature, after which the child of perfect organization acquires the language of its surroundings and try to make our pupils imitate syllables and words instead of commencing to teach them the A, B, C, as is done with hearing children immediately after they enter school. The usual method of teaching beginners to give the powers of the letters of the alphabet first and then combining the elements thus obtained into syllables was discarded in this institution about three years ago (in 1881). The plan substituted therefor consists in drilling the pupil at once in the articulation of little words of easy pronunciation, such as papa, mamma, eye, toe, etc."

"Most of the deaf-mutes, with whom the Word method has been tested, learn to imitate all the sounds of the alphabet in combinations of syllables and words. In a few exceptional cases *g* (hard), *k*, *s*, and *sh* could not be obtained in that manner and to be developed separately. But it is well known that some hearing children also find difficulty in pronouncing these sounds and do not give them correctly for years. The saving of time and labor is not the only advantage which the Word method offers. If you begin to say the word *fan*, but stop abruptly after the first element of this word, viz., *f* is completed, you will see that the sound which you produce in this way is more prolonged and drawn out a great deal more, and is involuntarily uttered with a great deal more force than we give to it in the word. It is utterly impossible for anybody to pronounce the *f* sound or any other consonant separately with the abruptness, ease, and natural manner with which it is pronounced in a combination with other sounds. Therefore, the attempt to teach deaf-mutes to give the powers of the letters separately must needs produce a harsh, forcible, and unnatural utterance, whereas if the word method is used, he is more apt to learn to speak in a pleasant, natural, and easy manner." From the report of the same institution for 1886 we quote a single paragraph: "Most of the pupils of our preparatory department not being mature enough to begin to learn how to imitate words, we generally let them practice such compounds as were mentioned above." (These were "ba, ba, ba, ba; boo, boo, boo, boo; ma, ma, ma," etc.) A full exposition of this method by Mr. Greenberger is published by this Association in a pamphlet entitled "The Word Method."

All teachers of speech to the deaf naturally utilize, so far as possible, any hearing pupils possess. Recently the attention to articulation in schools, in which it had not previously been taught, has brought to light the fact that in every school there are many pupils who possess some degree of hearing. It was natural that under the system previously employed in those schools this should have failed to be discovered. This discovery has led to the formation of classes in which this varying amount of hearing is developed by use, both with and without the usual mechanical aids, such as hearing-tubes, ear-phones, and audiphones, etc. In some cases and to some classess instruction is given exclusively through the hearing. These classes are said to be taught by the Aural Method. Mr. Gillespie of the Nebraska Institution and Miss McCowen of Englewood school are the leaders of this movement, which has become an important

one. Its effect upon other schools has been to increase the attention paid to the cultivation of even slight hearing, which might have been previously neglected.

The adherents of these various methods of teaching speech naturallv claim each for his own, certain excellencies far outweighing those to be found in the others. There may yet be formed that happy combination which will retain the best of all with the weaknesses of none. Meanwhile gain has surely been made in many directions. The standard established in all our schools is far higher than a few years ago. Greater distinctness and smoothness of speech; better voices and less exaggeration in facial movements are everywhere noticeable. The schools and congresses of the European world and the conventions of articulation teachers in America have contributed largely to this advance in our work. Perhaps no single influence has done so much for the improvement of articulation work in America as the introduction of the system of Visible Speech. The absence of any possible connection between the symbols and the elements which they represent except through their pictorial character gives them a value intrinsically their own. Though at this date the symbols of Visible Speech are taught to the pupils in but few schools, the distinctness of knowledge which familiarity with them has given some of our teachers cannot be over estimated, and in general in no other way has the work been advanced so much as by the greater attention to the study of ways and means on the part of the teachers. The increasing value of the results attained in our schools has led to wider attempts to teach articulation and lip-reading. No argument is so sure to convince as the argument ot difficulties overcome and success achieved. From the small beginings which we have noted only a quarter of a century ago we have now three thousand six hundred and eighty-two pupils in America who are taught speech. Few schools remain in which articulation is not taught to a greater or less extent and the proportion of pupils so taught is larger each year. In a considerable number of schools the pupils are not only taught speech and lip-reading, but are being educated through speech and lip-reading—such are the schools under Mr. Greenberger's charge in N. Y.; the Clarke Institution in Northampton; the Horace Mann School in Boston; the Oral Branch of the Pennsylvania Institution; the Providence; Portland; Milwaukee; Englewood; Cincinnati and Scranton Schools and numerous small schools and classes.

Another quarter of a century—let us hope—we will see great gain in methods and in results. Looking back the way seems short

and the good gained seems great—looking forward we can but hope that better results will inspire others to do this work and to do it far better than we have learned to do it. The work of articulation teaching, though as yet but imperfectly done, is well begun. The results attained are meagre in comparison with those we believe attainable. Let it be the effort of this Association and of each individual member of it to forward the work of giving speech to the deaf children of America. The General Conventions and conferences deal largely with subjects connected with mental development and the acquisition of language—to us is left the work of perfecting ways and means of giving the powers of speech and speech-reading—let us not be tempted to bring the larger and certainly far more important work of those other bodies into our sessions. There is work enough for us to do here and now in the effort to improve our methods of giving the power of vocal utterance to the children who otherwise were silent.

THE PRESIDENT:—I would like to ask Miss Yale where she found the statements of the elder Whipple alluded to in her paper,

MISS YALE:—From the report of a hearing before a legislative committee at the time of the organization of our school.

THE PRESIDENT:—I think they dated back to 1830. I would like to know how you got them. I understand from you that they were introduced about 1865 or 1866 in the Massachusetts legislature; but still you have quoted letters of a much earlier date, (1830), and these surely go back to an earlier authority. In justice to Mr. Whipple I should like to know more about them.

MISS YALE:—Most of the extracts given were taken from the report of the hearing alluded to; a few were from letters written by Mr. Whipple to Miss Rogers. These letters are now in my possession.

DR. BELL AND "THE LITTLE PEOPLE."

HOW HELEN KELLER WAS TAUGHT TO SPEAK.

MONDAY, JULY 6, 1891—10 A. M.

THE PRESIDENT: The next paper will be on "How Helen Keller was Taught to Speak."

Whatever may be the difficulties which you have to encounter in teaching speech to a child who is simply deaf, how much greater must be the difficulty encountered if in addition to that deafness you have superadded the terrible calamity of blindness. We have all heard of that remarkable little girl, Helen Keller, a blind deaf child; and we know that she has been taught to speak so that anyone can understand her. I am sure it will be of interest to this Association to know how it was done, how it came about that one should try to teach her to speak. I am sure this Association will listen with very great interest to Miss Fuller, Principal of the Horace Mann School for the Deaf, by whom this work has been accomplished.

MISS SARAH FULLER: Possibly I cannot better begin an account of the way in which Helen Keller was taught to speak than by reading a letter written by herself in response to my wish to know how it happened that she came to wish to speak.

THE PRESIDENT: How old was she when she wrote that letter?

MISS FULLER: Not quite ten.

THE PRESIDENT: How long had she been under instruction when she wrote it?

MISS FULLER: Two years.

SOUTH BOSTON, Mass., April 3, 1890.

MY DEAR MISS FULLER: My heart is full of joy this beautiful morning, because I have learned to speak many new words, and I can write a few sentences Last evening I went out in the yard and spoke to the moon. I said, "O, moon, come to me;" do you think the lovely moon was glad that I could speak to her? How glad my mother will be. I can hardly wait for June to come, I am so eager to speak to her and to my precious little sister. Mildred could not understand me when I spelled with my

fingers, but now she will sit in my lap and I will tell her many things to please her, and we shall be so happy together. Are you very, very happy because you can make so many people happy? I think you are very kind and patient, and I love you very dearly. My teacher told me Tuesday that you wanted to know how I came to wish to talk with my mouth. I will tell you all about it, for I remember my thoughts perfectly. When I was a very little child I used to sit in my mother's lap nearly all the time, because I was very timid, and did not like to be left by myself. And I would keep my little hand on her face all the while, because it amused me to feel her face and lips move when she talked with people. I did not know then what she was doing, for I was quite ignorant of all thing. Then when I was older I learned to play with my nurse and the little negro children and I noticed that they kept moving their lips just like my mother, so I moved mine too, but sometimes it made me angry and I would hold my playmates' mouths very hard. I did not know then that it was very naughty to do so. After a long time my dear teacher came to me, and taught me to communicate with my fingers and I was satisfied and happy. But when I came to school in Boston I met some deaf people who talked with their mouths like all other people, and one day a lady who had been to Norway came to see me, and told me of a blind and deaf girl she had seen in that far away land who had been taught to speak and understand others when they spoke to her. This good and happy news delighted me exceedingly, for then I was sure that I should learn also. I tried to make sounds like my little playmates, but the teacher told me that the voice way very delicate and sensitive and that it would injure it to make incorrect sounds, and promised to take me to see a wise and kind lady who would teach me rightly. That lady was yourself. Now I am as happy as the little birds, because I can speak and perhaps I shall sing too. All my friends will be so surprised and glad. Your loving little pupil,

HELEN A. KELLER.

TUSCUMBIA, Alabama, Oct. 20, 1890.

MY DEAR MISS FULLER: Oh, no! I have not forgotten you, dear friend; I have thought of you every day, and I love you more than ever. I will tell you why I have not written before. After I came home I was sick for a while, and the doctor said I must be very quiet and not get tired or I would be very ill. We all went away to a beautiful mountain, where it was cool and pleasant, and I did nothing but play, and ride my dear donkey. You must know I had a lovely time climbing the steep paths, and gathering the pretty wild flowers. Lioness, my great, faithful, mastiff, always went with us. When we were tired and sat down on a fallen tree to rest she would roll in the leaves, or lie quietly at our feet. Sometimes the rain came down in torrents, then we stayed in the house and amused ourselves. Mildred and our little cousin, Louise Adams, were very happy together. I used to swing them in the hammock, and have fun with them. They could understand all that I said to them, and sometimes I could tell what they said, by feeling of their lips. Are you not delighted because I can speak so well? My dog comes bounding to me when I call her, and all of my friends know what I say, if I speak distinctly. I have learned a great deal about my loving heavenly [Father,] and the dear Christ. I am very, very happy. God wants us to be happy. I think He wanted you to teach me to speak because He knew how much I wished to speak like other people. He did not want His child to be dumb, and when I go to Him he will let His angles teach me to sing. I wonder if your beautiful, new school is finished. You must give my dear love to all the children and the teachers. I hope they have not forgotten Helen. When I see you, I shall have much, very much to tell you. I am studying every day, and learning all I can about plants, and numbers, and the beautiful world our Father has given us, I am so glad that we shall live always, because there are so many wonderful things to learn about. Teacher sends love, and little sister sends a kiss. Lovingly, your little Friend,

HELEN A. KELLER.

The first intimation to me of Helen's desire to speak was on the 26th of March, 1890, when her teacher Miss Sullivan, called upon me, with Helen, and asked me to help her to teach Helen to speak, for, said she, "Helen has spelled upon her fingers, 'I must speak.'" As I had, nearly two years ago, expressed my belief in the possibility of her acquiring speech, I was glad to know that she was to be allowed to make an attempt to use her vocal organs, and began immediately to familiarize her with the position and condition of the various mouth parts and with the trachea. This I did by passing the hand lightly over the lower part of my face and by putting her fingers into my mouth. She quickly appreciated that the teeth enclose the tongue which fills the entire mouth cavity, that the tongue and lips are exceedingly soft, delicate and very flexible, that the lower jaw moves up and down and that the course of the trachea may be followed as it passes down behind the bony framework of the chest. I then placed my tongue in position for the sound of 'i' in 'it,' and let her find the point as it lay perfectly still in the bed of the jaw just behind the lower front teeth, and to discover that the teeth were slightly parted. After this investigation I placed one of her forefingers upon my teeth and the other upon my throat, or trachea, at the lowest point where it may be felt, and repeated the sound ĭ several times. During this time, Helen standing in front of me, in the attitude of one listening intently, gave the closest attention to every detail, and when I ceased making the sound, her fingers flew to her own mouth and throat and after arranging her tongue and teeth, she uttered the sound ĭ so nearly like that I had made, it seemed like an echo of it. When told that she had given the sound correctly, she repeated it again and again. I next showed her by the sensitive finger the depression through the center of the tongue when in position for the sound of ă and the opening between the teeth during the utterance of that sound. Again she waited with her fingers upon my teeth and throat until I sounded ă several times, and then she gave the vowel fairly well. A little practice enabled her to give it perfectly. We then repeated the sound of ĭ and contrasted it with ă. Having these two differing positions well fixed in her mind, I illustrated the position of the tongue and lips while sounding the vowel ô. She experimented with her own mouth and soon produced a clear, well-defined ô. After acquiring this, she began to ask what the sounds represented and if they were words, and I then told her that ĭ was one of the sounds of the letter *I*, that ă was one of the sounds of the letter *A*, and that some letters had many different sounds, but that it would

not be difficult for her to think of these sounds after she had learned to speak words. I next took the position for ä, and Helen following as before with her fingers, and while sounding the vowel, slowly closed my lips producing the word, arm. Without hesitation she arranged the tongue, repeated the sounds, and was delighted to know that she had pronounced a word. Her teacher suggested to her that she should let me hear her speak the words, "mamma," and "papa," which she had tried to speak before coming to me, and she quickly and forcibly said "mum mum," "pup pup." I commended her effort and said that it would be better to speak very softly and to sound one part longer that she did the other. I then illustrated what I wanted her to understand, by pronouncing the word "mamma" very delicately, and at the same time drawing my finger along upon the back of her hand to show the relative length of the two syllables. After a few repetitions the words, "mamma," "papa" came with almost musical sweetness from her lips.

Notes of this and of all but two of the other lessons were unfortunately destroyed, so that I cannot give in detail an outline of the work with Helen from day to day.

One of these two papers has no date, but I think it contains the second lesson. It records the vowel sounds ô, ĭ, â, ă, û, and the consonants m, b, p, n, d, tr, k, g, s, r and y. The other marked "Fifth Lesson" records that I gave Helen the vowel ŭ, ă, ĭ, ē, ĭ, ā, ô, ŭ, and ū, which she was to practice with her teacher, associating them the following words,—cup, son, young, father, arm, aunt, pipe, pie, cry, me, eat, teeth, pin, baby, curtain, slate, nail, day, boot, rude, foot, put, tube, few. The consonants associated with words were, p in cup, b in tub, m in come, t in cut, d in do, n in in, k in cuff, g in go, s in some, f in muff, w in one, wh in what. The other consonants upon this paper, v, r, and the double consonants tr, dr, br, are not written with key words, so I concluded that more drill upon them was needed before allowing her to use them in words.

The plan with her was this: to develop at each lesson new elements, review those previously learned, listen to all the combinations she could make with the consonants, as initial and final elmements, and to construct sentences with words resulting from these combinations. In the intervals, between the lesons, she practiced these with Miss Sullivan.

She really had but ten lessons, although she was with me at other times, talking freely, but not under instruction, She was an

ideal pupil, for she followed every direction with the utmost care, and seemed never to forget anything told her.

On the day she had her seventh lesson, she and her teacher were invited to lunch at the house of a friend. While on our way there, Miss Sullivan remarked that she wished Helen would use the sentences she had learned, and added that she seemed very unwilling to do so. It at once occurred to me that the cause of her reluctance was her conscientious care to pronounce every word perfectly, and so during the moments I had with her during our visit, I encouraged her to talk freely with me, while I refrained entirely from making corrections. She was much interested in the bric-a-brac in the various rooms and asked a great many questions, using speech constantly, and, when just before our leaving the house, my friend took her upon his knee, she inquired of him about his boyhood, his studies, and his early home. She told him about her studies and her home and family. Early in the day she had said to me that she would tell me of her visit to Dr. Holmes, and as I thought this a favorable time to listen to her story, I reminded her of her promise. Seeing that she was so interested in what she was about to say, that she thought of speech only as a vehicle for thought, I noted her words as she spoke them. There were, I think, but four which I did not readily understand, and those she spelled upon her fingers. Her pronunciation of some words was peculiar because of her dlviding them into syllables as: na-med, lov-ed, plea-su-re. She did not hesitate in her attempt to pronounce any word that she wished to use to express her thought. In saying "good bye" to an aged sister of the gentleman who had been spending the winter with him she said: "He must be very happy to have you here." Her enjoyment of this, her first experience in the real use of speech was touchingly expressed in her remark to Miss Sullivan, when seated in the street car on her way home that afternoon, "I am not dumb now."

A still greater freedom in her use of speech was shown in a conversation which she had with Prof. Bell, Miss Sullivan, and myself, two weeks later. We spelled our questions upon our fingers, but she replied orally.

(Read from notes.)

She left Boston on the 17th of June to go to her home in Alabama. As this letter which I received from her in October tells me of her use of speech, it may be of interest to you.

DR. BELL: How did you first begin to teach her?

MISS FULLER: I began by passing her hand over my face and allowing her to feel the different mouth parts. This I repeated until I found she understood the position of the organs and their relation to each other.

DR. BELL: What was the occasion of her first use of speech?

MISS FULLER: Her interest in things and persons about her while lunching at the house of a friend. Her speech was slow, but very distinct, and I think no one could have failed to understand what she said.

DR. BELL: How old was she then?

MISS FULLER: Under ten.

DR. BELL: How long was she under instruction in language?

MISS FULLER: I think she had been under instruction about two years. It was her first real use of speech in conveying her thoughts. Previously she had confined her speech to sentences which she had been taught. On this day I encouraged her in every way to talk freely, and refrained from making any corrections. She became so much excited from her conversation that I thought I would turn her attention from it, and so proposed that she should tell us the story of her visit to Dr. Holmes, which she did, and which I noted.

DR. BELL: You did not write it down later?

MISS FULLER: No, I wrote it down as she spoke. I wrote just what she said.

DR. BELL: I understand you to say this is her exact language, did she write that or speak it?

MISS FULLER: She spoke it, and I wrote it.

DR. WILLIAMS: How long was that after her first lesson in articulation?

MISS FULLER: Her first lesson was on the 26th of March; this was on the 19th of April, after her seventh lesson.

MR. BOOTH: Less than a month after the beginning of her instruction in articulation?

MISS FULLER: Yes, sir.

DR. GILLETT: How are you able to give the phraseology?

MISS FULLER: She spoke slowly, and I wrote it down immediately from her lips.

DR. BELL: I thought that what you read was a letter from Helen Keller; but it turns out to be a transcript of the actual conversation. We want to know all about that.

MR. WESTERVELT: Miss Fuller has sought to imitate Helen Keller's speaking; and as the little girl is not here, we would certainly like to have the spirit of the thing as fully as possible.

MISS FULLER: The gentleman at whose house we were visiting sat with her upon his knee, Miss Sullivan was directly in front of her, and I was near. Helen asked him about his boyhood and his studies, and then told him that she studied Latin and knew a little French, repeating some French phrases. Earlier in the afternoon she had talked about the pictures that were in the rooms. I reminded her of her promise to tell me about Dr. Holmes. I saw she settled back as if she were very glad to do it. I then took a pencil and paper and noted the words that I have just read.

DR. GILLETT: You make some mention of pictures. What did she know of pictures?

MISS FULLER: I told her what they were. She would feel the frames and I would describe them to her. Of course, we used the manual alphabet in speaking to her.

DR. GILLETT: And much of what she said was told her before she said it?

MISS FULLER: She would ask questions about things and I would tell her about them. I remember that, at one time, she spoke of the beautiful moon.

DR. GILLETT: Well, she could not have felt that; how did she come to know of the beauty of the moon, and how did she know it was shining or not?

MISS FULLER: I really don't know about that.

PROF. GORDON: A great many blind persons have an exhilarated feeling in the presence of the moonlight.

MISS FULLER: She was a phenomenal child.

DR. GILLETT: The question is, whether she is a stray child, dropped down here from another world.

DR. BELL: Dr. Gillett, that is what we want to examine. We want to look into that critically. We have a lesson to learn from this child. Miss Sullivan has taught her language. How can we suppose that her success in the use of language is due to a superhuman faculty in her, or to the methods of teaching which were adopted; why is it that a child deprived of both sight and hearing should make greater progress in language than those who are simply deaf. There must be something in the method by which she was taught, which we ought to know.

DR. GILLETT: Where does her poetic sentiment come from?

MISS FULLER: It may be interesting to know that she lost hearing at nineteen months of age. Her mother told me that at this time she was seized with convulsions, and that there was no relief for

several hours. I think she said it was on Thursday afternoon she was seized with convulsions and did not fully recover until the following Saturday or Sunday, and then she had very little sight or hearing. It was only a few months after that she became wholly blind. I think that is correct, Dr. Bell?

DR. BELL: I think so; I tested her.

MRS. WILSON: I would like to ask if a deaf and blind person could be taught to speak without learning the sign language?

MISS FULLER: I think so.

MRS. WILSON: Did she know the sign language before she began to articulate?

MISS FULLER: She was not taught the language of signs but she had language which was taught through the manual alphabet.

MRS. WILSON: That would be necessary before she was taught to articulate.

MISS FULLER: I think she might be taught as our little children are taught speech. Perhaps you remember that in Helen's letter to me she speaks of the pleasure which she had in moving her hands over her mother's face. Until that letter was written, no one knew why she did this.

DR. GILLETT: This letter was written by Helen Keller and not by Miss Sullivan?

MISS FULLER: Yes, sir.

MR. CALDWELL: How did she speak a word like Dr. Holmes which has silent letters?

MISS FULLER: I gave her at the second lesson, key words and she often guessed at the pronunciation of words. On this day when she had the seventh lesson, she attempted to pronounce a great many words that had not been given to her.

DR. BELL: I observe we are asking questions prematurely to the completion of the paper. We had better reserve them until the end.

DR. GILLETT: With regard to this paper, I should like to say it looks as good as any copperplate engraving.

MISS FULLER: Perhaps I should say at this time, that the day that Dr. Bell saw her and heard her speak he expressed a strong feeling in regard to the use of the manual alphabet and its connection with her language. So I urged him to visit with me another little blind and deaf girl, that he might see the difference between the children; one was phenomenal and the other but an average child. It was on this occasion that the following notes were taken of a conversation between Dr. Bell and Helen:

Do you know what a cloud is? Rain.

What is rain? Moisture.

Where does the rain come from? From the ocean.

From the ocean, how? It falls down.

How does it come from the ocean? It rises up.

What makes it rise up? The waves, — sun and waves.

Have you been upon the ocean? Yes, I went in a steamboat to Plymouth. The ocean is very large and deep.

What do you think about the wind? I think the wind is not as gentle as the breeze.

What is wind? Air; it is wild air.

Where does the wind come from, and where does it go to? It comes from the waves beating against the shore and it makes the wind.

Where does the wind go to? Back to the water. When the waves are very gentle, it goes to the sea, deep, deep sea. When the sea is very gentle, then the wind stops and goes to another place. The sea is the mother wave of the wind and waves.

What is the sun? Heat. What is heat? It is like a fire. What is a fire. It is heat.

Here is a hard question: What is thought? When we make a mistake, we say, I thought it was right.

Are you thinking now? I am trying to think. Sometimes we are thinking about something in our heads.

Is thought in your head? Yes.

Where is your thought? (Helen illustrated by describing the outline of her face, and then said, Mind). My head is full of mind. Ask teacher a question.

(Mr. Bell then spelled upon his fingers) Does Helen dream? (Miss Sullivan answered) Yes. (Mr. Bell) What does she dream about? (Miss Sullivan said) Ask Helen.

(Mr. Bell to Helen) Do you ever dream? Yes.

What do you dream about? About a very funny house. Last night I dreamed about a very funny house. It was shaped like an orange, and it was yellow. The beds were shaped like a pomegranate, and the chairs were like balls with a flat seat. The tables were shaped like a triangle. (Helen illustrated by forming a triangle with her fingers.) (Mr. Bell remarked) That was a funny dream.

Were there any people in the house? They did very queer things. What? They wore breastpins on their shoes.

Did they talk to you? No, dear, I only thought about it. I was not one of them. There were some bangles on their heads and rings on their wrists.

How did you know they had rings on their wrists? Did you feel them? No, I only dreamed that I saw them in the window. Do you mean that you saw them with your eyes? Yes.

Were you on the outside of the house? I passed it, and looked in. Were the curtains drawn? No, and it was very light. What were the people doing? They were throwing their handkerchiefs at each other and dancing. That was what they did. (Helen illustrated by action.)

And were they talking? No, they were only making funny sounds. (Helen illustrated.) Their eyes slanted down.

Could they see? There were five eyes. One was in the middle of the head, one was on the nose, two were slanting (illustrated as before), and one was (pointing to the bridge of the nose). Do such people live in Boston? No, it was only a story. Was it a dream or a story? Both.

One bright Sunday afternoon a few weeks ago I went to see a kind poet named Dr. Holmes. He was sitting in his beautiful library with a great many books around

him and a cheerful fire. I think the poet must be happy with so many friends near him. Teacher told me that the Charles River was flowing beneath the library window. Dr. Holmes said that he loved that gentle river very dearly. I had read many of his poems and known some of them. I liked them very much. I liked them before I thought of putting my arms around his neck and telling him that he gave pleasure to me and all the blind children, because his poems are in raised letters. Dr. Holmes is an old gentleman. I talked to him, and looked at the beautiful things, and he gave me a stamp box. He showed me a picture of his house, and he gave me a picture of himself. The house was the house which he wrote about in his poems "The Opening of the Piano."

(This is the memorandum dated May 7, 1890.

Dr. Bell asked a great many questions that would have puzzled even a hearing child. I remember very well Helen's manner when replying, her face was very expressive.

DR. BELL: I remember asking her:—"Helen, what is wind?" She said, "I think wind is not as gentle as the breeze;" and then, after a moment of deep thought, her face lightened up, and she exclaimed, "Wind is wild air." Miss Fuller can tell us how old she was when that occurred.

MISS FULLER: That was on the seventh of May, and she was ten years old the following June.

DR. BELL: And how long a time after you gave her her first lesson?

MISS FULLER: About six weeks.

DR. BELL: And all that was done by word of mouth?

MISS FULLER: Everything. I received a letter dated the 20th of October, telling me about her use of speech.

DR. GILLETT: What is your theory about that child?

MISS FULLER: I have no theory. I think she is outside the pale of theories. I don't believe there is another child in the world like her. Her mother said before her deafness she did not consider her remarkable.

MR. BOOTH: Had she any speech before this sickness at nineteen months?

MISS FULLER: I think not.

MR. BOOTH: Do you think she could understand speech at nineteen months?

MISS FULLER: She probably could understand speech; but I doubt if she could speak many words, because if she had done so her mother surely would have remembered it. She has good antecedents.

MR. BOOTH: Did Helen have any memory of her life before this sickness.

MISS FULLER. I think not.

DR, GILLETT. The point brought forth this morning was with reference to the use of language and a certain poetic sentiment. Do you know anything of her people having any peculiar taste or aptitude in any special direction—mathematics, for instance?

MISS FULLER. I do not.

DR. WILLIAMS. The last time I saw Helen Keller was about six or eight months ago. I went to Boston to spend Sunday and stayed over Monday on purpose to see her. She had just been ill with Scarlet fever, and had been brought back to school but the day before. I went into the parlor and she was called down and I sat beside her and talked with her for half an hour, I should think. We talked about all subjects; she was full of life and fun. I talked to her by spelling, but I don't think that during the whole conversation she spelled once to me. Everything was given orally, and there were very few words during that conversation that I could not understand; where I failed to understand I think perhaps the difficulty was with me and not with her, because my hearing is not sharp, and if it had been I might have caught all she said. After we had been talking a long time she laughingly told me that she could play on the piano. I asked her if she wonld play for me. She said "yes," and sitting down to the piano she drummed on it with one finger the air of some little tune, giving the notes correctly, but the time was faulty. Then in a joking way I asked her if she could sing. She said "yes." I asked her to sing for me, and she sang one line for me. It was rather monotonous, a portion of "Sleep, Baby, Sleep." Then there were some questions asked her in arithmetic by her teacher while I was there, and she showed she could grasp the idea of numbers very well.

DR. GILLETT. You say her family are of good stock, well educated people. Are there other children in the family?

MISS FULLER. Yes, but I have never seen them. I have seen only the mother. I have never heard anything precocious about the other children. Mr. Williams has spoken about her playing on the piano. I think it may interest you to know that one afternoon, while at my home, a young lady let her try the cornet. Helen wanted to know its use and how to play it. The young lady showed her how to play, and at the first effort she produced a clear note.

DR. WILLIAMS. That girl is a prodigy.

DR. BELL. I had the privilege of seeing Helen Keller before she was educated. Her parents passed through Washington and called upon me. I saw the child and had an opportunity of examining her. They then went on to South Boston and engaged a private teacher. Six months after I received a letter from Helen Keller couched in such remarkable terms, so beautifully expressed, that I became suspicious of the stories that were told about her, and desired to see her for myself. I thought it hardly possible she could have written such a letter unaided. Two or three months after that her mother and teacher and the little child herself again passed through Washington, and they let me know of their presence in the city. I went down to the hotel and saw Helen. She was in a room by herself, busily engaged writing a letter to her father. No one was there, and it was just as remarkable a letter as she had written to me; and when I came to talk with her myself, without the intervention of the teacher, I found the language was there. She had not been a year under instruction. I talked with her as freely as I could to any hearing child, using the manual alphabet, and she replied to me so rapidly that I could hardly read what she said. I had to touch her frequently to make her spell more slowly.

Now when you talk to a deaf child who has been less than a year under instruction you generally have to ask all the questions, and it is often difficult to get an answer in words; but the moment this child found that I could use the manual alphabet she turned with eagerness to ask me questions of various kinds. She wanted to know whether I had ever seen an elephant. When I replied in the affirmative she plied me with questions, and after I told her all about the elephant she ran over to her teacher, Miss Sullivan, and repeated what I had said. I saw at once that we had here a most remarkable intellect, but intellect could not by itself evolve an existing language. Language comes from without and could not be acquired intuitively however remarkable the intellectual powers might be.

I came to the conclusion that her knowledge of language must have been due to the way she had been taught, so I asked her teacher, Miss Sullivan, how she had taught the child. If I understood her correctly, she replied that she simply talked to her on her fingers, using complete sentences, and employing language like she would have employed in talking to a hearing child of her age. She also introduced her to books, printed in raised letters for the blind; I asked whether Helen was fond of reading, and she replied: 'Oh

yes, she devours books, she reads everything we have for the blind.' I then took Helen's hand in mine, and spelled the sentence, 'Are you fond of reading?' At once she became excited and wanted to show me a story. She brought a book for the blind written in ordinary language in raised letters. She passed one hand over the lines and spelled the words with lightning speed, emphasizing words here and there, and showing through appreciation and enjoyment of the story. It was a pretty childish story about a bird's nest with five blue eggs in it. I looked over the book and found it full of little interesting stories such as hearing children enjoy, couched in ordinary language. Helen has always been a constant reader and intensely interested in books. I am inclined to think that this fact is an important point in accounting for her knowledge of language.

MISS YALE: A member of the Institution spoke to me in the highest terms of Helen's speech.

DR. WILLIAMS: I think there are two or three things which will account, in part, at least, for Helen's marvelous use of language. In the first place, she is a very remarkable child in herself; and there is no doubt whatever, that, like some other people and to a degree that is very seldom equalled, she has the gift of language; and if she had all her senses, she would be a remarkable scholar. Then she has a teacher who has a great deal of the poetic element, and who has a great command of language, and she has that teacher all day long from the time she gets up in the morning, until she goes to bed at night; incessant individual practice. Then, further, she has a most remarkable memory. I don't believe she ever forgets the words she has once learned. I remember Miss Sullivan saying or writing very soon after she took her and began to give her words, that the little girl would take a hundred new words a day without any difficulty, and not forget one of them. Now she carries on almost ceaseless conversation on all sorts of subjects, and she has a memory that holds on to every word she hears.

DR. BELL: She does not hear.

DR. WILLIAMS: I don't mean that, but she has this constant repetition of words, and once a word enters her mind, it stays there forever; and she is able to take words and digest them to hold and make them her own.

MR. GROESBECK: I hope the letter which Helen Keller wrote to Miss Fuller, telling of her desire to speak will be printed in the report of these proceedings. I think it will convince people who do not

believe in such a capacity that when deaf children want to learn to speak they can do it.

MISS BLACK: Could not Helen be taught by letters on the hand to better advantage? Because in that case more people could converse with her. Can she understand anything that is spelled out by touching spots on her hand representing letters?

MISS FULLER: I think that very few persons know the Dalgarno alphabet.

MISS BLACK: If she worked with a glove how would it be? That is the way a girl in my school was taught. I can't talk with Helen Keller because I haven't sufficient facility with the manual alphabet to talk with her. I could easily talk with the child if she were accustomed to a lettered glove.

MISS FULLER: I think one could do that very readily.

MR. LYON: Is this letter of Helen Keller's to Miss Fuller written with artificial assistance?

MISS FULLER: She uses a grooved tablet to guide her, between which she writes.

PROF. GORDON: I can hardly sit still, hardly keep quiet, when Helen Keller is before us. I think we are doing a duty, not only to ourselves, by bringing these facts out, but we owe it to the scientific world to ascertain the facts as accurately as possible and to study them as accurately as possible. There have been things stated here to-day, which perhaps, attracted only a moment's observation, which will stir the scientific world. There have been statements made here in regard to Helen Keller which are of intense interest to psychologists, and I am very glad they are brought out in such a way that there can be no doubt about the truth of them.

There is another phase of the subject—I think that those who have Helen Keller in their particular charge, should be cautioned with regard to physical conditions; and the reason I speak of this is, because I fear she is living under high pressure; her brain is exceedingly active, and the connection between that brain and the mental development is so intimate that a very slight change in the condition of the one, may make a very great change in the condition of the other. I had a little experience in my home that makes me think a great deal about this particular point. If you will excuse me, I will say I have a little daughter, who has, or had, that somewhat rare and yet not unique power, of seeing pictures with her eyes shut. She had this visualizing power so that, at a moment's notice, on asking her to shut her eyes, she would rattle off a description of 'pictures she saw,' scenes

that surpassed many of the wonderful things we read in the Arabian Nights; and as graphic in their way as the pictures of Dorè; pictures she never saw before, new combinations, which occured instantly, and at any time; all she had to do was to close her eyes and in an instant she would rattle off the description of the pictures in her mind. The child could not sleep in the dark, because she was seeing so much. This past winter, however, during the prevailing epidemic she was taken severely ill. The illness lasted only a few days, perhaps, but there was intense congestion in the ear, so that the physician was very much afraid she would lose her hearing; her eyes were affected also, and there was copious bleeding from the nose which continued through a day, in spite of all efforts to control it. From that time to this she has never seen any "pictures." There has been a change in the physical condition, and we think there has been a permanent loss of that peculiar power, though her illness has left no other mark behind it.

DR. BELL: The next thing upon the programme is my own lecture.

PROF. GORDON: "I would like to add, before we adjourn, one word in regard to Helen Keller. You remember she is very much interested in that blind child of Pittsburg, and has endeavored to raise a fund for his education, and she was requested to write a letter to seven or eight newspapers for publication in regard to it. When she was called on for the letter, she had written seven or eight different letters on the same subject."

(*Adjourned until half-past two.*)

THE FUNCTIONS OF THE EPIGLOTTIS AND SOFT PALATE.

MONDAY, JULY 6, 1891.—11.30 A. M.

The instrument of speech consists essentially of a collection of tubes or passage-ways connected together somewhat as shown in the following crude diagram, which I have found of assistance in explaining to pupils the functions of the epiglottis and soft palate. (See Fig. 4.)

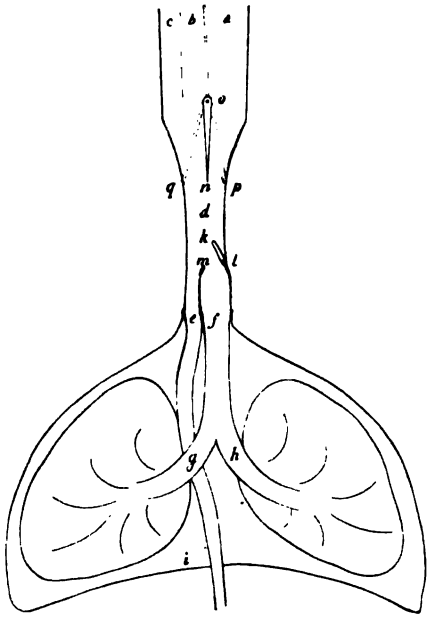


Fig. 4. Diagram illustrating the action of the epiglottis (k) and soft palate (n).

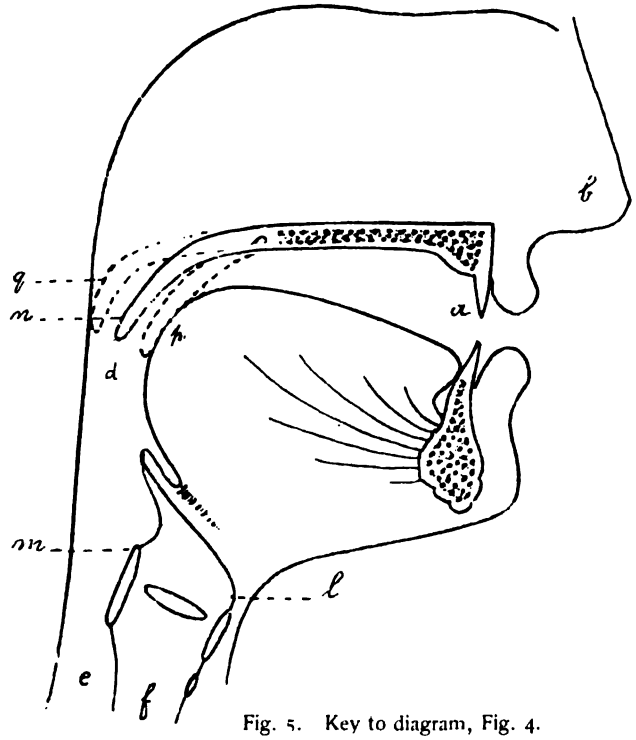


Fig. 5. Key to diagram, Fig. 4.

There are three entrances into the vocal organs; a, the mouth, and b, c, the nostrils. Following these passages downwards we find they unite in one passage, d, the pharynx. Below this point the passage-way splits up into two tubes, e, f, the æsophagus and the windpipe. The windpipe, f, bifurcates lower down into the bronchial tubes, g, h. These in their turn split up into multitudinous smaller tubes, ramifying through the lungs. The æsophagus, e, passes downwards between the bronchial tubes, g, h, through an aperture in the diaphragm, i, into the stomach.

In this apparatus we find two valves one, k, (the epiglottis) hinged at l, and capable of shutting against m. The other, n, (the soft palate), hinged at o, and capable of shutting against p, and q.

These valves are largely for the protection of the lungs. We all know how important it is that foreign bodies should be kept out of the lungs. The New York doctor who recently inhaled a cork has died, in spite of all that science could do to aid him. Equally serious results might follow were particles of food to find their way into the lungs.

The pharynx, d, forms a common passage-way through which both food and air pass, and the valves, k, n, are contrivances to prevent the passage of food into the windpipe, and to permit of breathing with safety during the process of mastication. If we were obliged to breathe through the mouth-passage, a, while the mouth contains partly masticated food, it would be almost impossible to prevent particles from being drawn into the lungs with the breath. To obviate such a catastrophe the valve, n (the soft palate), shuts in the contents of the mouth during the process of mastication, by closing against p (the back of the tongue), as shown by dotted lines. Breathing can then be carried on safely behind the soft palate through the nasal passages, b, c. When, however, the process of mastication is completed, a new danger threatens the lungs. The food on its way to the stomach through the æsophagus, e, must pass the upper end of the windpipe, f. To prevent the possibility of food obtaining access to the wrong passage-way, the valve, k, (the epiglottis), closes tightly against m during the act of swallowing. The larynx constitutes a sort of box on the top of the windpipe, of which the epiglottis k, forms the lid. In the diagram, I have represented the lid as shutttng down on the top of the box, but in the actual instrument of speech the box also shuts up against the lid. Place your hand against your throat, and you can feel the larynx rise when you make the act of swallowing. In speech, the soft palate n, is used for the purpose of directing the breath through the mouth or nasal passages, as desired. When it shuts against p, (the back of the tongue), air from the lungs passes up behind it through the nasal passages b, c, and no air can escape through the mouth a. When it shuts against q, (the back of the pharynx), air from the lungs passes in front of it, through the mouth a, and no air escapes through the nasal passages b, c. When it hangs half way down, as shown in the position o, n, air from the lungs escapes through all three passages, a, b, c, simultaneously.

METHODS OF STUDYING THE MECHANISM OF SPEECH.

I have already directed your attention to the fact that many words, and even sentences, may be pronounced during a single effort of expiration. The muscles concerned in expiration produce a continuous, steady pressure upon the air in the thorax, during the act of speech. In fact, we play upon the instrument of speech as the piper plays upon the bagpipe. The piper's arm continuously

squeezes the bag all the time he is playing. He does not jerk his arm in time to the music. A continuous, steady pressure exists all the time his fingers are moving. When an amateur tries to play upon the bagpipe for the first time, he is apt to give a fresh squeeze for every note, producing an effect somewhat like the jerky utterance of deaf children who have been taught word-by-word articulation.

When children are taught at first to pronounce each word by itself, with a distinct and separate effort of emission, an intermittent action of the abdominal muscles is apt to become habitual, even in rapid utterance.

We have had the opportunity of listening to pupils from Milwaukee, Boston, and Philadelphia, and I have been delighted to observe that they do not exhibit this fault. Whatever defects of speech they possess, they do not exhibit the fundamental error of word-by-word, syllable-by-syllable articulation. I would certainly recommend to your notice the exercises that have been so successful in producing continuity of utterance.

The material from which speech is made, is a store of compressed air within the thorax, which is let out little by little, in a continuous, steady stream, and moulded into the various sounds of speech. No compression is possible unless the escape of air is restrained. In order that we should have a continuous, steady stream, it is necessary that emission should take place through only a very fine orifice. You all probably know the effect of restraining the emission of fluid from a pipe, under pressure. If you haven't made the experiment, partially plug the orifice of a faucet with your finger, while the water is running. At once the slow, silent stream, is converted into a rushing torrent, which spurts out with great noise. Instead of a large quantity of water coming out slowly, you have a small quantity rushing out quickly. Instead of a silent flow you have noise. In the production of noise a little water goes a great way, and a steady stream can be sustained for a long period of time, without the expenditure of much fluid.

In a similar manner, noise is produced by partially plugging the air-passage from the lungs; and all the elements of speech result from constrictions of some kind. In studying the mechanism of speech-sounds, therefore, it is necessary to determine the location and nature of those constrictions that produce and modify the sounds.

Now how are you going to describe a constriction? My father has pointed out that the principal organs concerned in the production of speech, naturally group themselves into two classes, active and passive. As a general rule, the lower organs are active, and the upper passive. For example: In forming the sound of *t*, the point of the tongue is the active agent involved, and the upper gum is the passive. In this case the two organs are approximated together in such a manner as to completely close the passage-way between them.

In describing other constrictions also, it is usual to designate:—

(*a*) The active organ employed;
(*b*) The passive organ; and
(*c*) The condition of the passage-way between them.

Whether or not we adopt my father's classification into active and passive organs, it is certainly the case that we are obliged, in defining accurately the location and nature of a constriction, to distinguish three associated elements, viz:—

$\left\{ \begin{matrix} a \\ b \end{matrix} \right.$ Two organs which are approximated together; and

(*c*) The condition of the passage-way between them.

A constriction is usually termed "a position of the vocal organs." When two or more positions of the vocal organs are simultaneously assumed, the effect upon the ear is that of a single sound. In such a case the passage-way is constricted at more than one point at the same time. For example: Take the vowel *oo*, in such a word as *too*. In forming this sound three distinct positions (P, P′, P″,) are simultaneously assumed. (See Fig. 6.)

P. A labial position.

The two organs? $\left\{ \begin{matrix} a \\ b \end{matrix} \right.$ a The under lip. b The upper lip.

Passage-way between? c A small central aperture.

P′. A lingual position.

The two organs? $\left\{ \begin{matrix} a' \\ b' \end{matrix} \right.$ a′ The back of the tongue. b′ The soft palate.

Passage-way between? c′ A small central aperture.

P″. A laryngeal position.

The two organs? $\left\{ \begin{matrix} a'' \\ b'' \end{matrix} \right.$ a″, b″ The two vocal cords.

Passage-way between? c″ A slit-like aperture.

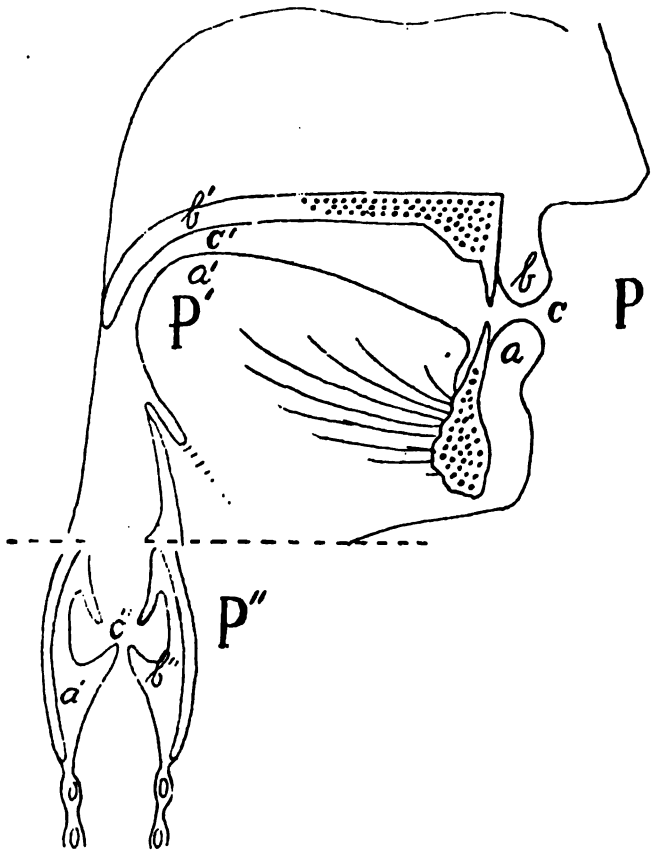


Fig. 6. Positions of the vocal organs in forming the vowels $\overline{oo}$ in "too." In this diagram a side view of the mouth is given in section, but a front view of the larynx so as to show both of the vocal cords.

The last position (P″) represents the condition of the glottis in forming "voice." The passage of air through the slit-like aperture occasions a vibration of the vocal cords. The glottis then alternately opens and closes with great rapidity, causing the emission of a series of puffs from the lungs. These puffs follow each other with such rapidity that the ear fails to distinguish the individual impulse, and recognizes only a continuous effect of a musical character, which we term "voice."

When we come to study the method of symbolizing positions of the vocal organs devised by my father, Prof. A. Melville Bell, and called by him "Visible Speech," we shall find great advantage from considering the symbols as algebraical signs. Positions, (like P, P′, and P″), which are simultaneously assumed, may be considered as

added together (P+P′+P″); but the three elements (a b c) which compose each position, must be taken as multiplied into one another (a×b×c.) Thus:—

Position for *oo*= P+P′+P″=a b c + a′ b′ c′ + a″ b″ c″.

Position symbols placed in juxtaposition without any connective sign between them must be taken as successively, not simultaneously, assumed. Thus P P′ P″ means: Assume first the position P alone, then P′ alone, and then P″ alone.

If the positions (P, P′, P″,) are assumed separately, instead of together, they yield sounds that are quite unlike the vowel *oo*. For example: If the labial position (P) be assumed without any other constriction in the passage-way, a sound results which is not an English element of speech. English-speaking children, however, give the sound when they blow upon their porridge to make it cool.

If the lingual position (P′) alone be assumed, the resulting sound is the German *ch* in such a word as *nach*.

If the vocalizing position of the glottis, (P″), be assumed without any other constriction higher up in the passage-way, an indefinite vowel sound results like the *er-er-er* of a hesitating speaker, or like the vowel heard in such words as *her*, *sir*, *word*, etc.

If two of the positions (P, P′, P″,) are simultaneously assumed without the third, still other sounds result which neither resemble the vowel *oo*, nor the sounds I have just described. For example:

If the positions P and P′ are simultaneously assumed without P″, the English consonant *wh* is produced.

If the positions P and P″ are simultaneously assumed without P′, the sound heard is that of the German *w*, in the word *wie*.

If the positions P′ and P″ are simultaneously assumed without P, the result is the Gaelic vowel in the word "*laogh*."

These facts may be arranged in tabular form as follows:

POSITIONS ASSUMED.	RESULTING SOUNDS.
P	Blowing to cool.
P′	German *ch* in "*nach*."
P″	The vowel *er* in "*her*."
P + P′	The consonant *wh* in "*what*."
P + P″	German *w* in "*wie*."
P′ + P″	Gaelic "*aohg*" in "*laogh*."
P + P′ + P″	The vowel *oo* in "*too*."

What we term an "element of speech" may in reality, like the vowel *oo*, be the result of a combination of positions. The true

element of articulation, I think, is a constriction or position of the vocal organs rather than a sound. Combinations of positions yield new sounds just as combinations of chemical elements yield new substances. Water is a substance of very different character from either of the gases of which it is formed; and the vowel *oo* is a sound of very different character from that of any of its elementary positions.

When we symbolize positions, the organic relations of speech-sounds to one another can be shown by means of an equation, for example:—

English *wh* = P + P′.
German *ch* = P′.
Hence German *ch* = English *wh*—P.

The equation asserts that the English *wh* without the labial constriction (P) is the German *ch*.

I performed this equation upon the mouth of Mr. Lyon during the course of my last lecture. While Mr. Lyon was prolonging the sound of *wh*, I forced his lips apart with my fingers, and you then heard the sound of German *ch*. Take another case:—

The English vowel *oo* in "too" = P + P′ + P″.
The Gaelic vowel "*aogh*" in "*laogh*" = P′ + P″.
Hence "*aogh*" = *oo* — P.

That is: The English vowel "*oo*," without the labial constriction (P) is *the Gaelic vowel "aogh."*

If then you desire to pronounce the Gaelic vowel "*aogh*, "sing the vowel *oo* while some one else forces your lips apart. This is a direction that will enable any English-speaking person to convert the known vowel *oo* into the unknown Gaelic sound "*aogh*," without the aid of hearing. In a similar manner, the sounds known to the deaf child can be converted into the unknown sounds of the English language. Indeed, manipulation succeeds better with a deaf person than with one who hears, because the hearing person attempts to retain the *sound*, whereas the deaf child simply tries to retain the *position*.

The symbols of Visible Speech bear the same relation to phonetics that chemical symbols do to the science of chemistry. In dealing with the mechanism of speech, it is as necessary now-a-days to make use of my father's symbols, as it is to use chemical symbols in treating of the composition of matter.

As many of you are already familiar with the subject, it will not be necessary for me to enter into any detailed description of Visible Speech. I shall, therefore, to-day, simply attempt to give a

general idea of the nature of my father's method of symbolizing positions of the vocal organs, so as to enable those who are unfamiliar with the subject to follow me intelligently in my use of the symbols.

The fundamental characters represent the vocal organs and the various kinds of apertures employed in the production of speech; and these can be combined into a compound form to express a position of the vocal organs.

A character shaped like a tube (⊂) is used to denote a very small aperture for the escape of breath; and when this tube is plugged up at one end (⊐) the symbol then indicates complete closure of the passage-way.

The symbols for the principal organs of speech are shown in Figure 7.

The active organs of the mouth, viz: the under lip, the point of the tongue, the top or "front" part of the tongue, and the back of the tongue are represented by curves that form, in such a diagram as that shown, the outlines of the organs themselves. This pictorial basis forms an element of great value in teaching the deaf.

The upper or "passive" organs, to which the lower or "active" organs are usually applied, are represented by the same symbols, written upon a small scale.

Thus, the symbol for the upper lip is a miniature of that for the lower lip; the upper gum, to which the point of the tongue is usually applied, has the point-tongue sign upon a small scale; the top of the hard palate is expressed by the symbol for the top or "front" of the tongue; and that part of the soft palate to which the back of the tongue is applied, is denoted by the back-tongue symbol upon a reduced scale.

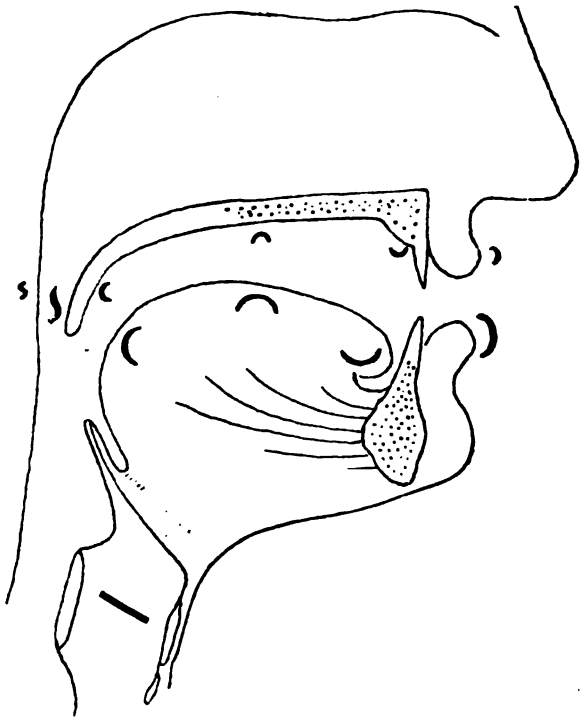


Fig. 7.

) Under lip.
‿ Point of tongue.
⁀ " Top " or " Front " part of tongue.
(Back of tongue.
ʕ Back of soft palate.
| Slit-like aperture between the vocal cords.
ɔ Upper lip.
ᴗ Upper gum.
ɑ Top of hard palare.
ɕ Front part of soft palate.
ˈ Back of pharynx behind soft palate.

The mode of combining these characters so as to express a position of the vocal organs, may be illustrated by symbolizing the constrictions shown in diagram Fig. 6.

	Expressed upon plan shown in Fig. 6.	Definition.	Expressed upon plan shown in Fig. 7.
The Labial Position	P		ɔ
The two organs	a	The under lip	)
	b	The upper lip	ɔ
Passage-way between ?	c	A small central aperture	(
	P = a b c		ɔ = (ɔ
The Lingual Position	P′		C
The two organs ?	a′	The back of the tongue	(
	b′	The soft palate	c
Passage-way between ?	c′	A small central aperture	(
	P′ = a′ b′ c′		C = (C
The Laryngeal Position	P″		I
The two organs ?	a″, b″	The two vocal cords	These are implied and are not specially symbolized.
Passage-way between ?	c″	A slit-like aperture	I
	P″ = a″ b″ c″		I = A slit-like aperture between the vocal cords.

The various combinations of these positions tabulated upon page 208, may be symbolized as follows:

POSITIONS ASSUMED.		
Expressed upon plan shown in Fig. 6.	Expressed upon plan shown in Fig. 7.	RESULTING SOUNDS.
P	ↄ	Blowing to cool.
P′	Cᶜ	German *ch* in "*nach.*"
P″	I	The vowel *er* in "*her.*"
P + P′	ↄ + Cᶜ	The consonant *wh* in "*what.*"
P + P″	ↄ + I	German *w* in "*wie.*"
P′ + P″	Cᶜ + I	Gaelic *aogh* in "*laogh.*"
P + P′ + P″	ↄ + Cᶜ + I	The vowel *oo* in "*too.*"

The equations to which I have directed your attention may be thus expressed:

1. German *ch* = English *wh* — P.
   $C^c = (ↄ + C^c) - ↄ$
2. Gaelic *aogh* = English *oo* — P.
   $C^c + I = (ↄ + C^c + I) - ↄ$

Three positions (P, P′, P″), have been shown in Fig. 6, but a fourth position, which has not hitherto been noticed, is also indicated in that diagram.

The soft palate is in contact with the back of the pharynx, thus closing the entrance to the nasal passages. Visible Speech affords us a means of expressing this position if we so desire. The portion of the soft palate that fits against the back of the pharynx, like other active organs, is represented by its own outline ( ), in such a diagram as Fig. 7; and the part of the pharynx with which it makes contact could, consistently with the notation, be represented by the same symbol in miniature (').

Combining these with the symbol for passage-way closed (ↄ), we could form the compound character ↄ' (soft palate shut against back of pharynx). In English utterance this position is constantly assumed during the act of speech, excepting when the sounds of *m*, *n*, and *ng* occur. As a matter of convenience the position of the soft palate is not noted excepting when these sounds occur.

When the soft palate is depressed, as in Fig. 7, a passage-way exists between it and the back of the pharynx, through which air escapes into the nasal passages.

This position may be thus expressed:

Ɛ' { "A central aperture between the soft palate and the back of the pharynx."

In forming *m* we shut the lips and pass voice through the nose. This sound, therefore, results from three positions which are simultaneously assumed.

Position for *m* = D³ + Ɛ' + I (See Fig. 8).

That is: "Under lip shut against upper lip" plus "central aperture, between the soft palate and back of the pharynx," plus "slit-like aperture between the vocal cords."

Position for *n* = Dᵘ + Ɛ' + I (See Fig. 9).

That is, "point of tongue, shut against upper gum" plus "central aperture, between the soft palate, and back of the pharynx,' plus "slit-like aperture between the vocal cords."

Position for *ng* = Ɑᶜ + Ɛ' + I (See Fig. 10).

That is: "Back of the tongue shut against the soft palate" plus "central aperture, between the soft palate and back of the pharynx" plus "slit-like aperture between the vocal cords."

RESUMÉ OF ELEMENTARY POSITIONS.

D³ = Under lip, shut against upper lip.

Dᵘ = Point of tongue, shut against upper gum.

Ɑⁿ = Top (or "front") of tongue, shut, against top of hard palate.

Ɑᶜ = Back of tongue, shut against soft palate.

Ɑ' = Soft palate, shut against back of pharynx.

Ɔ³ = Central aperture, between the under lip and the upper lip.

Ʊᵘ = Central aperture between the point of the tongue and the upper gum.

Ɑⁿ = Central aperture between the top (or "front") of the tongue and the hard palate.

Cᶜ = Central aperture between the back of the tongue and the soft palate.

Ɛ' = Central aperture between the soft palate and back of the pharynx.

I = Slit-like aperture between the two vocal cords.

An elementary position is expressed by a symbol composed of hree associated characters. For example:—

Ɔ³ = :)³ or P = a b c. (Fig. 6).

The sign for the constriction (c) is united with that for the

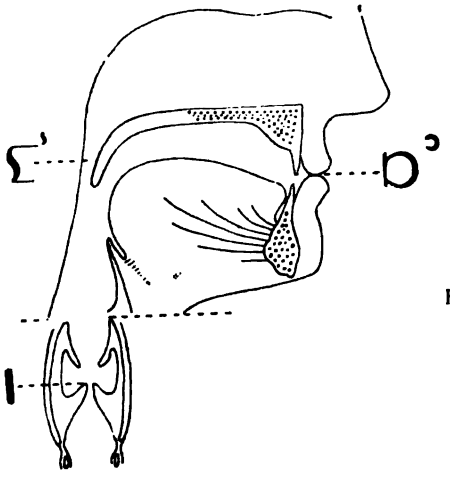


Fig. 8. Position for M.
ı + ɛ' + ɒ³ = ə

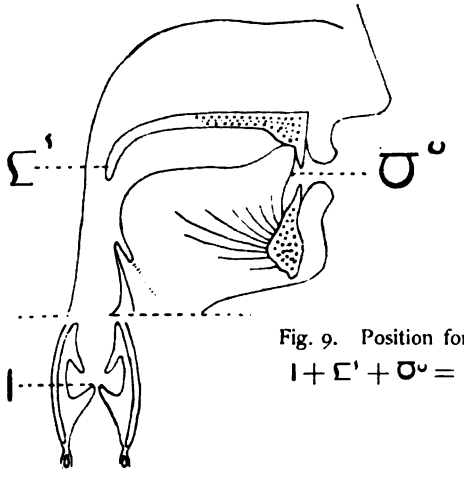


Fig. 9. Position for N.
ı + ɛ' + ʊ° = ɷ

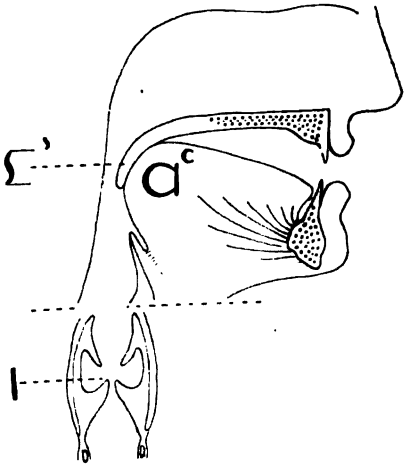


Fig. 10. Position for NG.
ı + ɛ' + ɑᶜ = ɛ

active organ (a) so as to form one character; and the passive organ (b) appears as a diacritical mark.

In order to express the mechanism of speech-sounds with accuracy, as many symbols are required as there are elementary positions to be represented. Hence many sounds like the vowel *oo* (Fig. 6), require at least three position-symbols to express their formation. (See also positions for *m*, *n*, and *ng;* Figs. 8, 9, 10.)

This method of symbolization, though admirable for the purposes of scientific analysis, would be unsuitable for current use as a phonetical representation of speech. For example: It would hardly be convenient to write the word "moon" in the following way!

M	*OO*	*N*
(Ɔ + Ɛ' + I)	(Ɔ + Cᶜ + I)	Ʊ + Ɛ' + I)
See Fig. 8.	See Fig. 6	See Fig. 9.

In order to fit the symbols for use as a phonetical alphabet, my father saw that it was necessary, or at all events advisable, that each sound should be represented by only one character; and that therefore, associated positions should be combined into a compound form capable of use like a letter of the alphabet.

By the adoption of certain principles of abbreviation this has been accomplished without interfering with the symbolic character of the notation.

ABBREVIATIONS.

1. Passive organs may in general be implied and not written. This plan gets rid of the diacritical marks save in exceptional cases. For example: Ʊ ("Point shut") alone, without any representation of the passive organ, is to be taken as meaning Ʊᵘ ("Point shut against the upper gum") for the upper gum is the usual place of application for the point of the tongue. The symbol expresses the position for *t*.

If, however, a deaf child should pronounce *t* by placing the point of the tongue against the top of the hard palate, then the passive organ must be shown, thus Ʊⁿ. So also when we represent the *t*-like sound produced during the act of spitting, Ʊᵓ ("Point of the tongue, shut, against the upper lip."

In forming the Sanscrit "cerebral *t*" Ʊᶜ ("Point of the tongue, shut against the soft palate") the passive organ, being abnormal, must also be indicated.

In general, the passive organ may be omitted without ambiguity, by adopting the rule that in such cases the active organ shall

be considered as applied to that passive organ which is represented by its own symbol in miniature. For example:

ↄ = ↄᵖ ᴗ = ᴗᵛ ᴖ = ᴖᵑ ᴄ = ᴄᶜ ᴇ = ᴇ'
ᴅ = ᴅᵖ ᴛ = ᴛᵛ ᴓ = ᴓᵑ ᴑ = ᴑᶜ ᴕ = ᴕ'

2. I have already alluded to the abbreviation employed to represent the vocalizing position of the larynx. The slit-like aperture (ı) alone, is used for the full position—the organs themselves (the vocal cords) being implied. This simple symbol (ı) is admirably adapted for combination with other signs into a single character. For example:—

ᴅᵖ + ı = ᴅ + ı = ᴪ
ᴛᵛ + ı = ᴛ + ı = ᴫ
ᴓᵑ + ı = ᴓ + ı = ᴔ
ᴑᶜ + ı = ᴑ + ı = ᴓ
ↄᵖ + ᴄᶜ + ı (Fig. 6) = ↄ + ᴄ + ı = ↄ + ᴄ = ↄ + ᴐ = ↄ + ᴐ

3. The symbol ɬ ("soft palate") is used to indicate ᴇ' (centre-aperture, between the soft palate and back of the pharynx"). This can be combined with other symbols into a single character. For example:—

(Fig. 8) ᴅᵖ + ᴇ' + ı = ᴅ + ɬ + ı = ᴐ + ı = ᴪ + ɬ = ᴭ (Position for *m*).

(Fig. 9) ᴛᵛ + ᴇ' + ı = ᴛ + ɬ + ı = ᴜ + ı = ᴫ + ɬ = ᴬ (Position for *n*).

(Fig. 10.) ᴓᶜ + ᴇ' + ı = ᴓ + ɬ + ı = ᴓ + ı = ᴪ + ɬ = ᴓ (Position for *ng*).

4. The most difficult case arises when two mouth-positions are simultaneously assumed, Fortunately the curves to be combined are usually of opposite kind so that one can be hooked on to the end of the other.

Thus ᴄ + ↄ = ᴐ or ᴐ

The resulting character, however, is of so awkward a shape that another hook is added for the sake of symmetry. Curves of this kind are what my father terms "mixed" symbols. For example:—

ᴄ + ↄ = ᴐ a labial position modified by the back of the tongue (English *wh*).

Or = ᴐ a back tongue position modified by the lips. (A labialized German *ch*).

ᴖ + ᴗ = ᴓ a front-tongue position modified by the point of the tongue (English *sh*).

Or = ʊ a point-tongue position modified by the top or "front" of the tongue (English *s*).

5. When two or more positions are simultaneously assumed, the sound may be considered as originating at the point of greatest constriction—the other constrictions merely modifying the effect.

In representing associated positions, therefore, the point of greatest constriction is selected as the base for the compound symbol, and the other positions are indicated in a subordinate manner.

For example, take the positions shown in Fig. 6. In this case we have three associated positions, P, P′, and P″.

Now if P, (the labial position), should happen to be the point of greatest constriction, a rustling noise will be perceived originating at the labial aperture.

This kind of sound is characteristic of air under pressure, escaping through a fine orifice. We can recognize by ear many varieties of the sound for which we have no name. It varies, according to the size of the orifice, and the degree of pressure, from a simple rustling sound—like the rustling of leaves upon a tree, to an intense hiss—like the noise of steam escaping from a locomotive. When the vocal organs yield a noise of this character, we call the effect a "consonant sound."

If, then, the *oo*-like effect produced by the positions shown in Fig, 6, is accompanied by a rustling sound at the labial orifice (P), we call the result a labial "consonant," and not a "vowel" although the voice is heard, The labial position becomes the base for the compound symbol which is then written as follows:—

ɔᵖ + Cᶜ + ı = ɯ (English *w*) a labial position modified by the back of the tongue and the throat.

If P′, (Fig. 6), be the point of greatest constriction a rustling sound is also heard, but in this case it originates within the mouth, at the back-tongue position (German *ch*), and the labial aperture simply modifies the effect. This rustling noise characterizes the sound as a "consonant" although the voice is also heard. In this case the back-tongue position becomes the base and the other positions are indicated in a subordinate manner.

Cᶜ + ɔᵖ + ı = ɕ. (German *ch* modified by the lips and vocal cords.

If P″ (Fig. 6), be the point of greatest constriction, the sound heard originates in the glottis. Instead of a continuous rustling noise or hiss, an intermittent effect is produced by the vibration of the vocal cords. The air escapes in a series of puffs that succeed

one another with such rapidity as to produce upon the ear the effect of a musical tone. Voice alone is heard without any rustling or whistling accompaniment in the mouth. This characterizes the sound as a "vowel". The sound originates at the position P″, and the mouth positions P, P′, merely modify the effect.

The slit-like aperture between the vocal cords is therefore made the base for the compound symbol; and the mouth positions P, P′, are indicated in a subordinate manner as follows:—

I + C^{c} + O^{c} = ɨ (vowel *oo*), a laryngeal position modified by the back of the tongue and the lips.

The vertical line or "vowel stem," represents (I) the slit-like aperture between the vocal cords (P″, Fig. 6), the black dot indicates the back-tongue position C^{c} (P′); and the horizontal cross-bar the labial position O^{p} (P).

The three sounds represented by the symbols ɜ, ɛ and ɨ, result from almost identical positions of the vocal organs, and in teaching the deaf the sounds themselves may be considered as identical. The subtle distinctions, however, recognized by the ear are faithfully depicted to the eye, in the shape and general appearance of the symbols.

The symbols for *w* (ʒ), and the vowel *oo* (ɨ), may be taken as typical of consonant and vowel symbols in general. A curve (*i. e.* a mouth-position), is the characteristic feature of a consonant symbol; and a straight line (I) (the slit-like aperture between the vocal cords), forms the basis of the vowel notation.

In conclusion I may say that the symbols for all the English consonants and vowels have been abbreviated to single signs, and that the phonetical alphabet thus produced is admirably adapted for use in schools for the deaf. The following example of abbreviation may be of interest:

M	*OO*	*N*	
(O^{p} + Γ′ + I)	(C^{c} + O^{p} + I)	(O^{u} + Γ′ + I)	= ʒɨʊ
Fig. 8.	Fig. 6.	Fig. 9.	

In my next lecture I shall present the symbols of Visible Speech in the way they are taught to the deaf.

Adjourned until 2.30 p. m.

COTTAGES AT CROSBYSIDE—LAKE GEORGE

SCHOOL OF PRACTICE.

MONDAY, JULY 6, 1891.—2:30 P. M.

MISS YALE: Miss Black will please present us with some of her work, and bring the children that she has with her.

MISS BLACK: I will read you some extracts from the Annals which will explain my work, and will then try to have the little ones go through their exercises for you.

(Miss Black here read an extract previously prepared by her for the Annals, descriptive of her work; and then brought her pupils on the stage and put them through a drill.)

She begins with the elements of the language, but makes more prominent the syllabic drill than do most teachers of the oral method. When in the course of practice an element or combination of elements is met, which forms a phonetic word, the meaning of which the child is capable of understanding, at this or any stage, it is explained by showing the object or action which it may name, and when the correct spelling of the word differs from the phonetic word, that is also shown; thus, a vocabulary of simple words is taught, and in course of time the word charts are substituted for the elementary and syllabic charts. However, the words taught are not confined to those on the charts. The child is encouraged to speak any word that he can speak at any time.

MISS MCCOWEN: Do I understand that those charts represent the sounds in the order in which they are given; or do you teach children that ē is the equivalent of ee, before he meets these in a word. Do you teach him from the chart first?

MISS BLACK: I teach him to utter the articulate sound first, then show him the character representing the sound on the chart, or by writing; then when meeting that element in a word he is more or less familiar with it.

MISS MCCOWEN: Do I understand that these charts represent the first work you give the child?

MISS BLACK: Yes; those containing the elements and combinations or syllables, and thus words are built up.

MR. BINNER: How long has the girl been in school?

MISS BLACK: She came in January, the winter before last, perhaps eighteen months. She is five years old, now. She has a slight degree of hearing. She lost hearing at a year old with spinal meningitis. She makes a clicking sound, like one calling to horse. When she came to me she used to sing herself to sleep. She had always used her voice a great deal in repeating inarticulate sounds. The boy lost hearing at five months. He is about ten years old.

THE PRESIDENT: Do you use the hearing tube with the little girl?

MISS BLACK: Yes, sir; although it is difficult to find time for much practice. I consider the speech-reading of so much greater importance for beginners. The little hearing which some have is utilized in correcting imperfect articulation.

THE PRESIDENT: I find that most teachers pay too little attention to these things; that is, the improvement of what amount of hearing they do possess.

MR. BINNER: We would like to know if the boy has any hearing?

MISS BLACK: Not a particle.

MR. BOOTH: To what extent do you teach grammar in teaching language?

MISS BLACK: I don't draw any line. I certainly teach Grammar.

MISS BEDFORD: How long has he been under instruction?

MISS BLACK: About five years. He had private instructors at home for two years, with some time intervening. I have had him for two years.

THE PRESIDENT: At what age did he lose his hearing?

MISS BLACK: When he was a little baby, not more than five or six months old.

MR. GROESBECK: He knew a few words before he had a teacher. He had been taught to spell a few words also.

MR. WESTERVELT: That is a very important matter. We want to get parents of the little deaf children interested in the work. We want them to appreciate how much they can do to aid the teacher. I would like Mr. Groesbeck to tell us a little of what he and Mrs.

Groesbeck have done for this little boy outside of the teacher's work.

MISS BLACK: I will state he is very good in figures, and can add very rapidly. He has been studying local geography, and can give the names of the sixty counties of New York State. He is going on with that now. His knowledge of local geography is good, and when he is traveling, he looks around and notes things. He has studied a little history, and you saw something of what he was doing in grammar. I call all grammar or sentence-building language. This work goes on with me as language. He can take from my lips, repeat, and write all the difficult elementary combinations without hardly ever making a failure.

(Prof. Gordon asked that he be given the word queer, to which the boy answered correctly.)

MISS YALE: We would like Mr. Groesbeck to tell us something.

MR. GROESBECK: In answer to Prof. Westervelt's question, I would say that we have tried to do the best we could to help our boy. When we first learned that he did not hear, and were told by the physicians that nothing could be done to restore his hearing, we felt that we could not have it so, and must find a way to offset his affliction if we could not overcome it. Our great desire was to prevent his being separated from us. We wanted to restore what he had lost; we wanted to talk with him and have him talk to us. We could not think of anything else but speech for him, and determined to work for the best results, yet, feeling that imperfect speech would be better than silence. We did not want to think that he could not hear, and kept talking to him all the time without regard to his inability to hear us, getting some comfort from the attempt to communicate with him in the natural way. In this way, he undoubtedly learned to watch our lips, and we may have unconsciously laid the foundation of his later work in lip-reading. He was very young at this time, but noticed everything quickly, learned much from observation, and was willing to be taught. As he became older, we began to teach him the names of things, with objects and pictures. We gave him alphabet blocks, and after a while he learned to put them together, and make a few words. We had no practical knowledge of the methods of instructing the deaf, and only worked with him in these ways until he should be old enough to be put under the instruction of an experienced teacher. We kept up this work until he was nearly five years old, when we felt that it was time to begin his

education in earnest. We were helped in this decision by the kind advice of Miss Fuller, of the Horace Mann School, and Miss Yale, of the Northampton Institution, with whom we had previously opened a correspondence. I had visited Northampton some time before, and was much interested in the successful work done there. We did not feel willing to send him away from home, and fortunately were able to secure the services of Miss Mary McGuire, of the Whipple Home School. To show his condition at this time I will quote from the first letter I wrote Miss McGuire. "He is nearly five years of age, is bright, intelligent, understands quickly, and learns easily. He can say 'Papa' and 'Mamma,' and tries to speak a few other words. He can read a few words from the lips, and can write a number of words in Roman letters." Under Miss McGuire's instruction he made rapid progress, and in a year was far advanced for so young a child. We have always tried to supplement the work of his teachers, and have not depended upon them to do it all. We have always devoted our time to him, have encouraged him to talk with us and ask us questions about everything he wanted to know, have given him the newspapers and atlas, and tried in every way to assist the more systematic training he was receiving from his regular instructor. His progress has well repaid the efforts that have been made. He can now read our lips readily, and talks freely, not only with us but with other people, and particularly with his playmates who are mostly hearing children. He seldom hesitates for a word, having a large vocabulary which he uses intelligently. His speech is good, but of course, is far from perfect. He talks so much and so rapidly, that he does not always articulate carefully, but is improving, so that we have reason to look for entirely satisfactory results when he is a little older.

Two years ago, feeling that it would be better for him to be taught with other children, we arranged with Miss Anna M. Black, who had just resigned her position as principal of the Rhode Island State School to come to Albany and start a home school for deaf children. During this time he has been under instruction and has made great improvement in his speech and mental development, so that we are now looking forward to the time when he can enter a hearing school and complete his education in such institutions.

I am glad that the parents of so many deaf children are trying to help them, and I believe much is being accomplished in this way. I fear, however, that all parents do not appreciate how much they can do for their children. To such I would say that they will find

they can accomplish much more for them than they expect if they will only try to do what they can. I would suggest to them the following: 1st. Before the child is old enough to have a teacher or be placed in school, begin talking with him, not occasionally, but all the time. Let him see you talk. Show him that it is the natural means of communication. This will help him in two ways. 1st, he will learn to watch the lips, and before you realize it, will begin to understand something of what you say. 2nd, he will see that others speak, and will try to imitate them. If he gets the idea of speech and a desire to talk, the later work of the teacher will be greatly helped and quickened. As the child gets older have him associate as much as possible with hearing people. Do not let him feel he is separated from them, but make him think he is like other people and can do as they do.

2nd. Supplement this work of talking by showing him pictures and objects. Teach him to associate names with them by writing or printing the words, or better, by showing him how to do it himself. Alphabet blocks or card letters can be used with advantage for this purpose.

3rd. Let all this work be done as a preparation for the regular work of the teacher. This should be commenced as early as possible and should not be neglected through feelings of sentiment or fear for the welfare of the child. Do not let your work drop after the child has commenced school. You can do much to help him and encourage the teacher, and his advancement will be more rapid if you are faithful to your duty. We owe much to those who are faithfully working for the education of children, and if we knew how much they appreciate our efforts to do something to help them we would, I am sure, work harder to accomplish it.*

MISS BLACK: I would like to speak of one circumstance. He was out playing the other day and met a lady with impaired hearing and spoke to her, but she did not understand him very well. He told his father afterwards that he understood the lady, but she could not understand him because she was deaf, and could not read the lips.

MISS YALE: Dr. Bell has consented to take some little children that have not been taught speech and do some work for us.

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* The foregoing is prepared with the acquiescence of Secretary Westervelt, to take the place of report of remarks copied from stenographer's notes.—E. A. GROESBECK

Dr. Bell then took charge of some children and illustrated his method of teaching.

DR. BELL: You must understand that while I claim the privilege of telling you in the forenoon what I want to tell you, I want to do in the afternoon just what you want.

(Dr. Bell here gave an exhibition of the clicks with Miss Black's little girl pupil.)

He said: "It does not matter what sound you get from a child as long as you get a sound. The plan is to follow the child up and symbolize the different sounds made, and get him to remember and repeat the varieties that occur. I go from the known to the unknown. The queer sounds children make are the known sounds to them and the English sounds the unknown. Children like the process, and this to my mind is a proof that it is suited to their condition. There is something wrong about a process that gives pain to a child. It grieves my heart to visit schools for the deaf and find little children constantly corrected for minor defects of pronunciation. The nagging process interrupts the flow of thought through speech, and is apt to dishearten the child in his attempts to speak. I would accept all sounds with approval, and utilize defective sounds in the way I have suggested above."

MR. BINNER: I would like to ask if it would not be well, after we close the afternoon session, that those who have pupils here take a place with them on the veranda, or in the parlor, and then anyone wishing to ask questions concerning methods would have an opportunity to do so. Such practical demonstration by teachers and pupils would be very valuable.

MISS YALE: I am sure everyone would be glad to have it tried. It is not necessary to make a motion.

THE PRESIDENT: You have heard the motion of Mr. Binner about veranda work, what is your wish? (Passed unanimously.)

MISS YALE: Those who would like Dr. Bell to work with Mr. Kiesel here now will please say aye; contrary no. (Passed unanimously,

Dr. Bell here illustrated his method of teaching adults.

(*The meeting then adjourned until 9:30 the following morning.*)

A literary, musical and social entertainment was given in the hotel parlor in the evening.

LECTURE

—ON—

VISIBLE SPEECH, AS TAUGHT TO THE DEAF,

—BY—

DR. ALEXANDER GRAHAM BELL.

·CHART I·

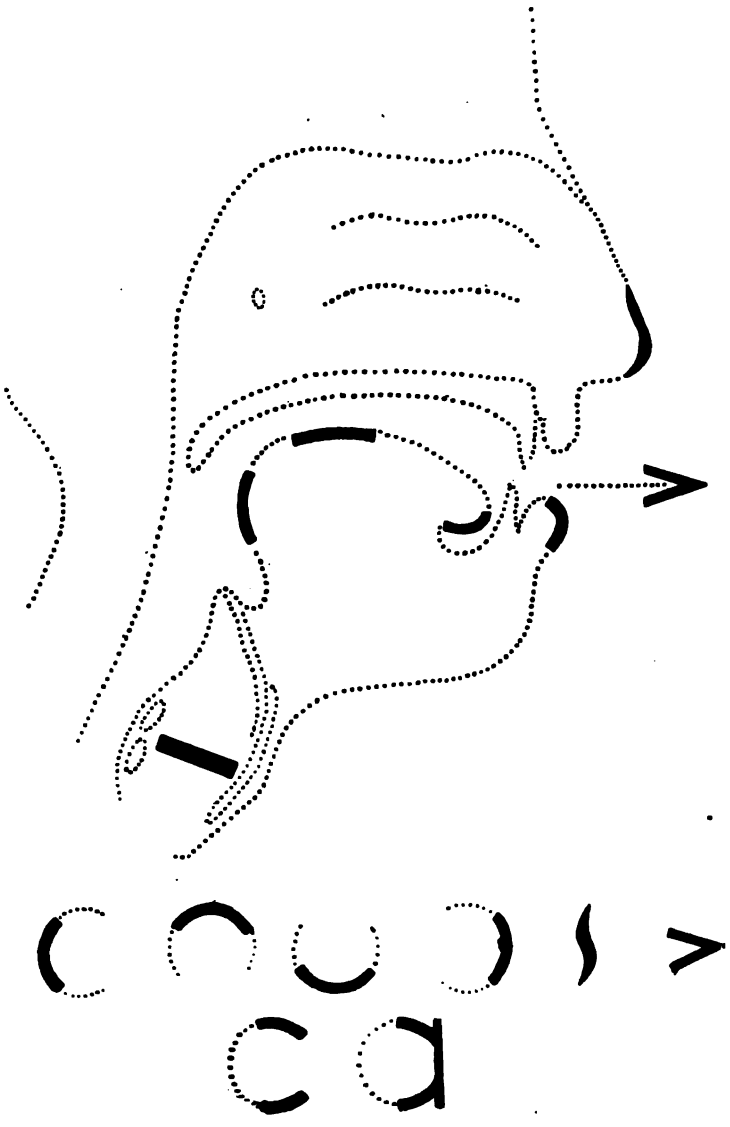

CHART II

CHART III

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೨	೩	೬	೯
೨	೩	೬	೯
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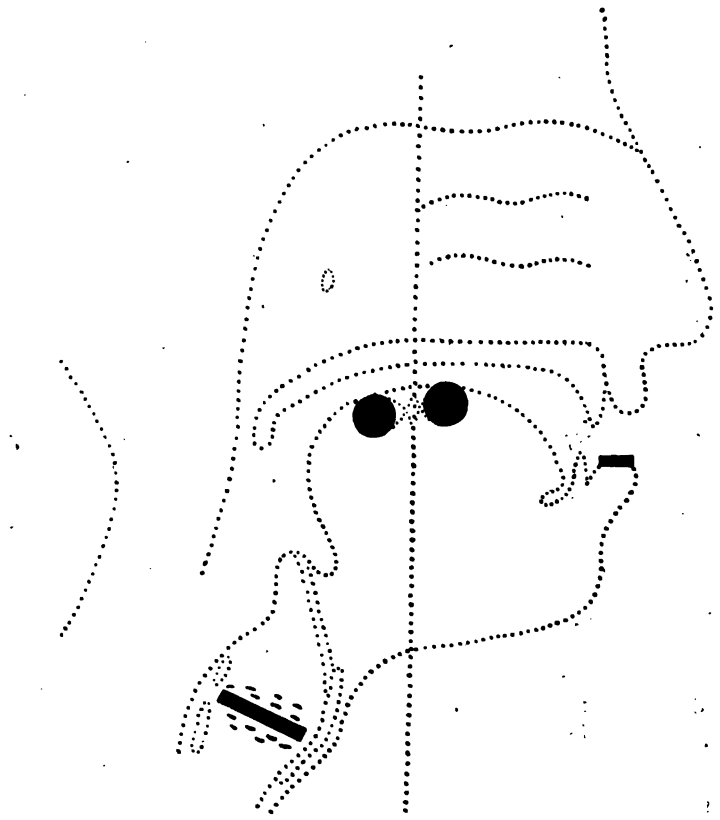
·CHART IV·



·CHART V·

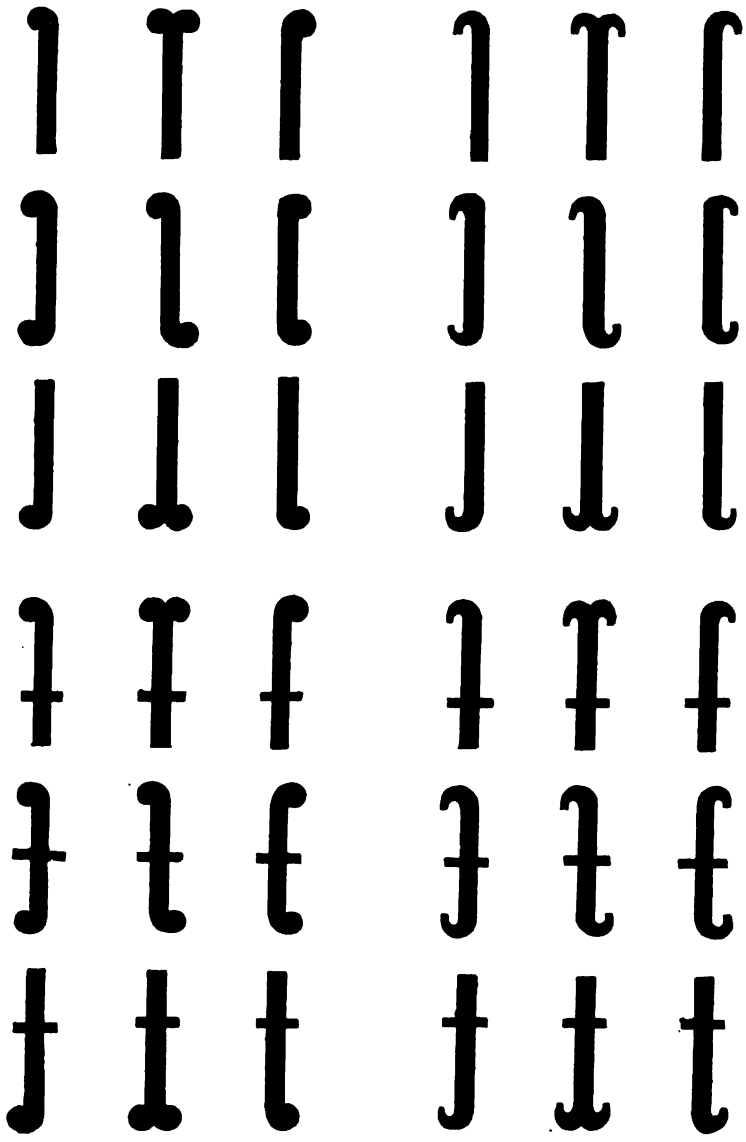


CHART VI.

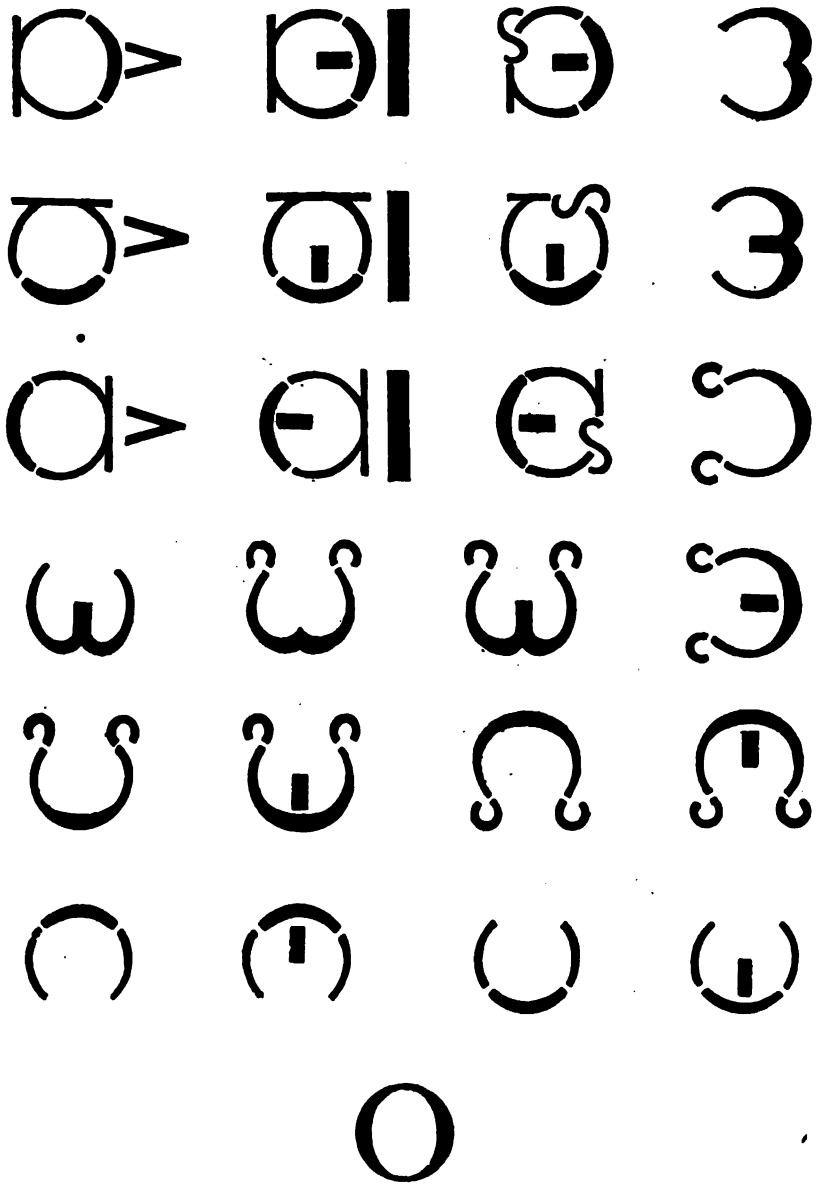
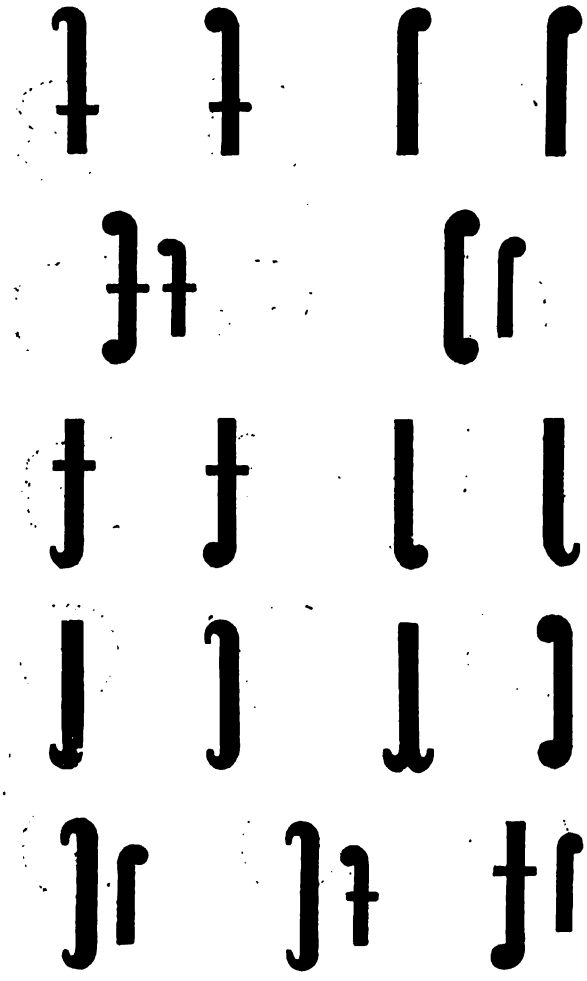


CHART VII



VISIBLE SPEECH AS TAUGHT TO THE DEAF.

TUESDAY, JULY 7, 1891.—9 A. M.

The following Charts are employed for the purpose of explaining to deaf children the meaning of my father's "Visible Speech" symbols.

The elementary symbols shown in Chart I. are compounded in Charts II. and III. to express positions of the vocal organs which yield consonant sounds. In Chart IV. we have other elementary symbols which are combined in Chart V. to express vowel positions. Chart VI. illustrates symbolically the positions of the vocal organs in uttering English consonants, and Chart VII. symbolizes positions that yield English vowels.

CHART I.

The teacher selects some member of her class, and pretends to draw upon the blackboard the profile of the pupil's face. She then looks into the pupil's mouth and proceeds to draw a picture of the interior of the mouth. The whole picture, when completed, constitutes a diagram like that shown in Chart I. The teacher then proceeds to test the children's comprehension of the drawing. She points to different parts of the diagram, for example the forehead, nose, upper lip, lower lip, chin, lower part of jaw, throat, etc. The children indicate their comprehension of the diagram by touching the corresponding parts of their own faces. Attention is then directed to the interior of the mouth, and the teacher points to the picture of the upper teeth, upper gum, top of the hard palate, soft palate, etc. The children touch or attempt to touch the corresponding parts of their own mouths. So with the lower organs,—the under teeth, the point of the tongue, the top or "front" part of the tongue, the back of the tongue, etc.

When the comprehension of the class has been well tested, the teacher erases from the blackboard all those parts of the diagram

which are shown by dotted lines in Chart I., leaving the Visible-Speech symbols in position as shown by the heavy lines.

The teacher points to the fragmentary remains of the picture upon the blackboard, and the pupils recognize the symbols as "the nose," "the under lip," "the point of the tongue," "the top, or front, of the tongue," "the back of the tongue," and "the throat." The arrow-head, which represents a sudden emission, or puff, of air from the mouth, is indicated by a sudden motion of the hand away from the mouth.

The next step is to have the pupils recognize the symbols independently of their position on the blackboard. The symbols are therefore written in one line below the fragments of the head (see Chart I.). The heavy lines alone are written, the dotted lines not appearing at all.

The pupils then compare these symbols with the fragments of the drawing above and identify them,—as (1) the throat, (2) the back of the tongue, (3) the top, or front part, of the tongue, (4) the point of the tongue, (5) the under lip, (6)the nose, and (7) puff of air from the mouth.

Finally the upper drawing is entirely removed from the blackboard, and the lower line of symbols alone is left. Each pupil describes these as follows : (1) he touches his throat ; (2) he points backwards into his mouth with a little jerk of the hand, indicating a part of the tongue further back in the mouth than he can well touch with his finger ; (3) he touches the top, or front part, of his tongue ; (4) he touches the tip, or point, of his tongue ; (5) he touches his under lip ; (6) he touches his nose ; (7) he places his hand near his mouth and then moves it suddenly away from the mouth to indicate a sudden emission, or puff, of air.

After these have been mastered, two new symbols, shown at the bottom of Chart I., are introduced. Here again it should be noticed that the symbols drawn on the blackboard consist only of the parts in heavy lines, the parts in dotted lines being omitted. The first of these new marks as you already know, symbolizes a pipe or passage through which air may pass. In the second case the pipe is shut, or stopped up, at one end. The first indicates a narrow central aperture or passage, somewhere in the mouth ; the second indicates the complete closure or shutting of the mouth-passage at some part. The idea is of too abstract a character to be explained at once to a deaf child who knows no language ; hence these

symbols are taught arbitrarily as positions of the fingers without any attempt being made to explain their significance. As a matter of fact, deaf children come to understand their meaning when applied to the explanation of positions of the mouth.

The pupils are taught to indicate the first symbol at the bottom of Chart I. by holding the thumb and forefinger of the right hand near to one another without touching. This sign we may translate as "centre aperture." The second, or "shut" symbol, is shown by bringing the thumb and forefinger together with a shutting action.

We may here notice that the straight line indicating a slit-like aperture between the vocal cords, is used in the sense of "voice." When a deaf child places his hand upon the throat of his teacher he can feel a vibration or tremor in the throat, whenever the voice is sounded. Hence he soon comes to associate the throat sign with a vibration of the vocal cords, and he indicates "voice" by touching his throat.

It should also be noticed that the "nose" sign is really pictorial of the pendulous extremity of the soft palate, and it indicates, as you have already learned, "soft palate depressed" so as to allow air to pass into the nasal passages. When a deaf child places his finger against the nose of his teacher while she pronounces *m*, *n*, or *ng*, he can feel a vibration or tremor of the nostrils, and to him the soft-palate symbol means voice or breath passing through the nose.

The symbols shown upon Chart I. are capable of being combined into compound forms, some of which are shown in Charts II. and III. Before proceeding, however, to the analysis of the compound characters on these Charts it may be well to assign briet names to the elementary symbols of Chart I.: these we can use to designate the gestures or signs employed by the deat child which have been explained above.

In the following Charts, I shall refer to the symbols at the bottom of Chart I. as—

1. Voice. 2. Back. 3. Front. 4. Point. 5. Lip. 6. Nose. 7. Puff of air. 8. Centre-aperture. 9. Shut.

CHART II.

The symbols on this Chart are named by the deaf child by analyzing them into the elementary symbols of which they are composed. We may translate his signs as follows :

First line.—1. Lip centre-aperture. 2. Point centre-aperture. 3. Front centre-aperture 4. Back centre-aperture.

Second line.—1. Lip centre-aperture, Voice. 2. Point centre-aperture, Voice. 3. Front centre-aperture, Voice 4. Back centre-aperture, Voice.

Third line.—1. Lip centre-aperture, Nose. 2. Point centre-aperture, Nose. 3. Front centre-aperture, Nose. 4. Back centre-aperture, Nose.

Fourth line.—1. Lip centre-aperture, Voice, Nose. 2. Point centre-aperture, Voice, Nose. 3. Front centre-aperture, Voice, Nose. 4. Back centre-aperture, Voice, Nose.

Fifth line.—1. Lip shut. 2. Point shut. 3. Front shut. 4. Back shut.

Sixth line.—1. Lip shut, Voice 2. Point shut, Voice. 3. Front shut, Voice 4. Back shut, Voice.

Seventh line.—1. Lip shut, Nose. 2. Point shut, Nose. 3. Front shut, Nose. 4. Back shut, Nose.

Eighth line.—1. Lip shut, Voice, Nose. 2. Point shut, Voice, Nose. 3. Front shut, Voice, Nose. 4. Back shut, Voice, Nose.

Long before a class has finished describing these symbols, the pupils begin to obtain the idea that the symbols are directions to do something with the mouth. For example, when they describe the first symbol in the fifth line, "Lip shut," some of them usually shut their lips. After the whole Chart has been described, it then becomes the teacher's duty to make the children understand that the compound symbols they have been describing indicate positions of the mouth. The teacher directs attention to her mouth while she assumes some of the positions symbolized. For example, she describes *seriatim* the symbols in the first line.

1. "Lip centre-aperture." She places her lips close together, leaving a small aperture between them. She then takes a pupil's hand and blows through this small centre-aperture against his hand. The resulting sound is not an English element of speech, but is the sound produced by blowing to cool something.

2. She describes the next symbol, "Point centre-aperture." With her hand she lifts up the point of her tongue and brings it into position against the upper gum, and makes the pupil look into her mouth and observe that there is a small aperture or hole between the point of her tongue and the upper gum. She then, without moving her tongue, blows through the point centre-aperture against the pupil's hand. The resultant sound is that of the French *r*, in the word *theâtre*, or the English *r* (non-vocal) in the word *tree*.

3. In a similar manner she shows that in pronouncing the third symbol "Front centre-aperture," the tongue is humped up in the middle, leaving a small centre passage or channel over the front of the tongue, through which she can blow against the pupil's hand. The resultant sound is that of the letter *h* in the word *hue.*

4. In pronouncing the fourth symbol she pushes her tongue towards the back part of her mouth with her hand, and shows that her tongue remains back when her hand is removed. She then lets the pupil feel that air can be blown upon his hand without moving the tongue. The resulting sound is that of the German *ch* in the word *nach.*

Proceeding next to the second line:

1. She shows that the first symbol, "Lip centre-aperture Voice," is the same as the first symbol in the first line, "Lip centre-aperture," excepting that a straight line is placed within the curve. She shows then that the lips are in the same position, but that a tremor or vibration can be felt in her throat which could not be felt when the other symbol was sounded. She takes the two hands of her pupil and places one against her throat, and holds the other in front of her mouth while she produces "Lip centre-aperture, Voice." The pupil sees the small centre-aperture between the lips, and feels the emission of air against his hand, and also perceives the trembling of the throat when the voice is sounded. The resulting sound is the German *w* in the word *wie.*

2. In a similar manner, keeping one of the pupil's hands on her throat and the other in front of the mouth, she produces the second symbol in the second line, "Point centre-aperture Voice," contrasting it with the second symbol in the first line, which has no voice. He sees the centre aperture over the point of the tongue, and feels the vibration of the voice and the emission of air from the mouth. The resulting sound is that of the letter *r* in the word *run.*

3. In a similar manner she exemplifies the third symbol in the second line, "Front centre-aperture, Voice." The resultant sound is that of the consonant *y* in *you.* In teaching the deaf, this may be considered identical with the vowel *ee.*

4. The fourth symbol in the second line, "Back centre-aperture, Voice," is shown to be the same as the German *ch* (Back centre-aperture), excepting that a vibration is felt in the throat.

Proceeding next to the eighth line:

1. The teacher describes the first symbol, "Lip shut, Voice,

Nose." In forming this sound the lips are shut and the voice is passed through the nose. She places one of the pupil's hands against her throat, and the other against her nose, and produces the sound of the letter *m*. The pupil sees the closure of the lips and feels a vibration in the throat and nose.

2. The second symbol in the eighth line, "Point shut, Voice, Nose," represents the position of the organs in forming the letter *n*. The pupil sees the point of the tongue shut against the upper gum and feels a vibration in the throat and nose.

4. The last symbol in the eighth line, "Back shut, Voice, Nose," expresses the position of the organs when producing *ng* in such a word as *sing*. Here the pupil sees that the back of the tongue is raised, and feels a vibration in the throat and nose. The object of this exemplification is simply to make the pupils understand what the symbols mean, and not to get them to make the sounds themselves. Still, the children generally try to imitate what the teacher does, and, of course, in some cases, they fail because they have not yet acquired control over their vocal organs. As it is not the object of their teacher at this stage to cause the pupils to make sounds, she should not take any notice of their failures for fear of discouraging them. She should be satisfied with evidences of comprehension as to the meaning of the symbols. Most children are able to take Charts I. and II. in one lesson. After reviewing these at a subsequent time the third Chart is explained.

CHART III.

The pupil's attention is directed to the symbol "Lip centre-aperture" (see the first symbol in Chart II.), which he describes by touching the under lip and then holding the thumb and forefinger close together without touching. The teacher then directs attention to the mouth, and shows that there is only one small hole through which the air passes. She then holds her lips together in the middle and allows air to escape through two side apertures, one at each corner of the mouth, showing the pupil that now there are two holes through which the air escapes instead of one. This fact she symbolizes by writing two "Lip centre-aperture" symbols one above the other, thus, forming a character somewhat like the Arabic numeral 3. This the pupil describes by touching his lip, and then holding near the thumb, two fingers, instead of one alone, indicating that the aperture is divided into two parts. Thus the thumb and

forefinger held together indicate one central aperture, and the thumb held near the fore and middle fingers indicates "divided aperture."

Turning now to Chart III. the symbols are described as follows:

First line.—1. Lip divided-aperture. 2. Point divided-aperture. 3. Front divided-aperture. 4. Back divided-aperture.

Second line.—1. Lip divided-aperture, Voice. 2. Point divided-aperture, Voice. 3. Front divided-aperture, Voice. 4. Back divided-aperture, Voice.

The 2nd symbol in the second line, "Point divided-aperture, Voice," expresses the position of the tongue in forming the sound of *l* in such a word as *love*. The point of the tongue is placed against the upper gum, and voice is passed through two side apertures, one on each side of the tongue. The symbols in the 3d, 4th, 5th, and 6th lines are what my father terms "mixed" symbols, involving two positions of the organs assumed simultaneously. The 1st symbol in the 3d line is composed of a large "Lip centre-aperture" symbol with a small "Back centre-aperture" hooked on to one end of the curve. For the sake of symmetry another small "Back centre-aperture" is attached to the other end of the curve, but this has no organic significance. This compound symbol expresses the position of the organs in sounding the English element represented by the letters *wh* in such a word as *whistle*. The back of the tongue is in the position for the German *ch* (Back centre-aperture), while at the same time a small centre-aperture is formed by the lips. The labial aperture being more obstructive than the back aperture, characterizes the sound as a labial letter. For this reason the "Lip centre-aperture" sign is made the most prominent part of the compound symbol. Deaf pupils describe this symbol as "Lip centre-aperture, Back centre-aperture."

Proceeding now with the description of the remaining symbols upon Chart III. we have:

Third line.—1. Lip centre-aperture, Back centre-aperture. 2. Point centre-aperture, Front centre-aperture. 3. Front centre-aperture, Point centre-aperture. 4. Back centre-aperture, Lip centre-aperture.

Fourth line.—1. Lip centre-aperture, Back centre-aperture, Voice. 2. Point centre-aperture, Front centre-aperture, Voice. 3. Front centre-aperture, Point centre-aperture, Voice. 4. Back centre-aperture, Lip centre-aperture, Voice.

Fifth line.—1. Lip divided-aperture, Back centre-aperture. 2. Point divided-aperture, Front centre-aperture. 3. Front divided-aperture, Point centre-aperture. 4. Back divided-aperture, Lip centre-aperture.

Sixth line.—1. Lip divided-aperture, Back centre-aperture, Voice. 2. Point divided-aperture, Front centre-aperture, Voice. 3. Front divided-aperture, Point centre-aperture, Voice. 4. Back divided-aperture, Lip centre-aperture, Voice.

Numerous other compound symbols might be built up out of the elementary signs shown in Chart I., expressing both possible and impossible positions of the organs. The forms shown in Chart II. and III. are not intended to be pronounced by the pupil, but are given simply as exercises in analysis. If the pupil can be made to understand the meaning of the compound symbols by analyzing them into their elementary forms, Visible Speech becomes a symbolic language, whereby any imaginable position of the vocal organs may be expressed, so as to be understood by the children.

The remaining symbols on Chart III. seventh line, are throat symbols. They picture various conditions of the glottis.

1. The first character, shaped like the letter O, pictures a wide aperture in the throat. The vocal cords are wide apart, leaving a large opening between them through which air may freely pass without obstruction. This is the condition of the glottis in uttering the letter *h*, and all non-vocal or breath consonants The letter *h* may, indeed, be considered as the non-vocal or breath form of a vowel. It has just as many different sounds as there are vowels. Pronounce such words as *he*, *hay*, *ha*, *hoe*, and *who;* it will be observed that the mouth-position for the sound of *h* is different in each word. *H* only occurs as an element of speech before a vowel. Under such circumstances the mouth position for *h* is the same as for the succeeding vowel, but the opening in the glottis is so wide as to allow the breath to pass into the mouth without sensible obstruction in the throat.

2. The second symbol in the seventh line, pictures a smaller aperture in the throat than the first. The vocal cords are brought near enough together to obstruct in some degree the passage of air between them, giving rise to a rustling sort of sound which is universally denominated "whisper." This is the condition of the glottis when we whisper vowel sounds. This position of the throat also may be assumed in uttering consonants, thus giving rise

to the "whispered" consonants, which in some languages are significant elements of speech, quite distinct in meaning from the "breath" and "voiced" consonants of similar formation occurring in the same languages.

3. We have already become familiar with the third symbol in the seventh line, as the representative of voice. It pictures a still smaller aperture in the throat than either of the preceding. The vocal cords are placed parallel to one another, and the aperture between them is reduced to a mere slit (pictured by a straight line). In this condition of the glottis the passage of air through the slit-like aperture occasions a vibration of the vocal cords, producing voice. This is the condition of the glottis in uttering vocal consonants and vowels.

4. The fourth symbol in the seventh line, pictures complete closure of the glottis. The vocal cords are pressed together so as to completely shut the aperture between them, and prevent the escape of air. This is the condition of the glottis aimed at by singers in practicing what is called the "*coup de glotte.*" It also occurs as an element of speech in certain dialects. For example: In the Scotch dialect as spoken in Glasgow, "Throat shut" is substituted for *t* (Point shut) in such words as butter, water, etc. In English also it occurs as an unrecognized element of speech in words commencing with vowels. In ordinary utterance every syllable really commences with a consonant. When words are supposed to begin with vowels, the "Throat shut" consonant really precedes the vowel sound, although it is not usually recognized as an element of speech by orthoepists. Pronounce with considerable force the names of the five vowel letters *a, e, i, o, u.* A closure of the glottis takes place before each vowel, excepting the last. The "Throat shut" consonant precedes the vowels *a, e, i,* and *o;* but *u* is preceded by the consonant *y.* Indeed, the name of the vowel might have been spelled *you* without affecting the pronunciation. The "Throat shut" consonant, followed by a forcible emission of air from the lungs, is familiar to every one in the form of a cough.

The meaning of the throat symbols shown in the seventh line, is explained to deaf children in the following way:

1. Touch the throat, and then hold the two hands together palm to palm, curving the fingers so as to cause the space between the hands to assume the shape of the first symbol. The idea to be conveyed is, that the aperture in the throat is somewhat of that shape, and very large.

2. Touch the throat, and then hold the hands together palm to palm, as before, but reduce the space between the hands so as to cause the aperture to assume the shape of the second symbol. The idea to be conveyed, is that the aperture in the throat is more contracted than in the former case.

3. Touch the throat, and hold the hands together palm to palm, as before, so that the aperture between the hands is reduced to a mere slit. At the same time give a quivering or trembling motion to the hands. The idea to be conveyed, is that the aperture in the throat is a mere slit, and that a trembling or quivering motion occurs in the throat which the pupil may perceive for himself by placing his hand upon the teacher's throat while the teacher produces voice.

4. Touch the throat, and then press the two hands together palm to palm with a shutting action, causing the hands to assume the appearance of the fourth symbol in the seventh line.

We may translate these gestures into words, and give names to these symbols, in the following manner :

Seventh line.—1. Throat open. 2. Throat contracted. 3. Throat a-slit (Voice). 4. Throat shut.

CHART IV.

When we compare the symbols shown on Charts II. and III. with those on Chart V., we notice a radical difference between them. The most prominent feature of the symbols on Charts II. and III. is a curve of some sort, whereas the characteristic of those on Chart V. is a straight line. By reference to Chart I. it will be seen that a curve is indicative of some part of the mouth, and that a straight line represents voice. The symbols on Charts II. and III. represent positions of the organs that yield consonant, and those on Chart V., positions that yield vowel, sounds. The generic difference between consonants and vowels is thus portrayed in the symbols. In consonant symbols the mouth position is made the characteristic feature of the symbol, the voice where it occurs being written subordinately by a straight line within the curve. In vowel symbols, on the other hand, the voice sign is made the characteristic feature, and the mouth position is represented subordinately by curves, or dots, or other marks appended to the voice line. Chart IV. is used for the purpose of explaining to deaf children the meaning of these appendages. The chief parts of the tongue employed in forming vowel sounds are the back and the front parts of the tongue. When

we draw a vertical line centrally through the diagram on Chart IV., we find that a dot or other mark on the right-hand side of the line rests on the front part of the tongue, whereas a mark on the left-hand side of the line rests on the back of the tongue. In vowel symbols a mark on the right hand side of the voice line indicates the front part of the tongue, a mark on the left indicates the back of the tongue, and a short horizontal line drawn across the vowel stem indicates that the lips are employed. Thus the symbols at the bottom of Chart IV. indicate (1) the voice; (2) the back of the tongue; (3) the back of the tongue; (4) both back and front of the tongue used simultaneously; [This is what my father terms a "mixed" position]. (5) back and front ["mixed"]; (6) back and front ["mixed"]; (7) the front of the tongue; (8) the front of the tongue; (9) the lips.

It will be observed that the appendages are placed sometimes at the top of the vowel stem, sometimes at the bottom, and sometimes at both ends. This pictures the elevation of the tongue in the mouth. When the mark is at the top of the vowel stem the part of the tongue indicated is placed high up in the mouth, leaving a small aperture between the tongue and the palate; when the mark is at the bottom the tongue is low with a large aperture; and when the mark is at both ends the tongue occupies an intermediate position with an intermediate aperture. Reading again the symbols at the bottom of Chart IV., we have (1) the voice; (2) back of the tongue high; (3) back of the tongue low; (4) back and front both high ["high mixed"]; (5) back and front both mid positions ["mid mixed"]; (6) back and front both low ["low mixed;"] (7) front low; (8) front high; (9) this symbol means not only that the lips are used but that the aperture between them is of a rounded form.

The deaf child is taught to indicate the small aperture formed by the high position of the tongue, by holding his thumb and forefinger close together without touching. (This is the same sign formerly described as meaning "centre-aperture.") The low tongue position with large aperture, is indicated by holding the finger and thumb far apart; and the intermediate position is represented by a half-way position of the thumb and forefinger. Thus, degrees of aperture are indicated by degrees of separation of the thumb and the forefinger.

We are now prepared to analyze the symbols on Chart V.

CHART V.—VOWELS.

The vowels on Chart V. may be divided into four groups of nine symbols each:

FIRST GROUP.—*Primary Vowels.*

Reading downwards we have:

First line.—1. High Back. 2. Mid Back. 3. Low Back.

Second line.—1. High Mixed. 2. Mid Mixed. 3. Low Mixed.

Third line.—1. High Front. 2. Mid Front. 3. Low Front.

SECOND GROUP.—*Wide Vowels.*

Reading downwards we have:

First line.—1. High Back Wide. 2. Mid Back Wide. 3. Low Back Wide.

Second line.—1. High Mixed Wide. 2. Mid Mixed Wide. 3. Low Mixed Wide.

Third line.—1. High Front Wide. 2. Mid Front Wide. 3. Low Front Wide.

THIRD GROUP.—*Primary Round Vowels.*

Reading downwards we have:

First line.—1. High Back Round. 2. Mid Back Round. 3. Low Back Round.

Second line.—1. High Mixed Round. 2. Mid Mixed Round. 3. Low Mixed Round.

Third line.—1. High Front Round. 2. Mid Front Round. 3. Low Front Round.

FOURTH GROUP.—*Wide Round Vowels.*

Reading downwards we have:

First line.—1. High Back Wide Round. 2. Mid Back Wide Round. 3. Low Back Wide Round.

Second line.—1. High Mixed Wide Round. 2. Mid Mixed Wide Round. 3. Low Mixed Wide Round.

Third line.—1. High Front Wide Round. 2. Mid Front Wide Round. 3. Low Front Wide Round.

Wide vowels differ from primary vowels by a slight widening of the oral passage; for example: Contrast the "high front" vowel (*ea* in the word *eat*), with the "high front wide" vowel (*i* in the word *it*). The oral passage for the latter is slightly larger than for *ee*, and Prof. Melville Bell believes also that the back part of the mouth, or the cavity of the pharynx, is more expanded in wide vowels than in primary. Widening the oral passage is indicated by a hook instead of a dot. Groups III and IV. are rounded vowels, that is, the passage between the lips is of a rounded form.

Deaf children describe these symbols by using the signs already mentioned in describing Chart IV., and we may translate their signs for the symbols on Chart V. as follows:

FIRST GROUP.

Reading downwards we have:

First line.—1. Voice, Back small-aperture. 2. Voice, Back mid-aperture. 3. Voice, Back large-aperture.

Second line.—1. Voice, Back small-aperture, Front small-aperture. 2. Voice, Back mid-aperture, Front mid-aperture. 3. Voice, Back large-aperture, Front large-aperture.

Third line.—1. Voice, Front small-aperture. 2. Voice, Front mid-aperture. 3. Voice, Front large-aperture.

SECOND GROUP.—*Wide Vowels.*

In teaching deaf children, the symbols of this group are considered as identical with those of Group I., and are described in the same manner. When the pupils have become familiar with the analysis of Visible-Speech symbols, they are shown, by means of the thumb and forefinger, that the positions symbolized in Group II. have a slightly wider aperture than the corresponding positions in Group I.

Prof. Melville Bell's conception of the expansion of the pharynx during the utterance of wide vowels, is a difficult one to convey to deaf children who know no language; I have, therefore, not attempted to do more than convey the idea that the mouth passage for wide vowels, is slightly wider than for primary vowels, so that the primary and wide symbols, taken together, represent six degrees of aperture; for example: Take the front vowels, commencing with the smallest aperture and ending with the largest, we have the following series of apertures:

1. High Front.
2. High Front Wide.
3. Mid Front.
4. Mid Front Wide.
5. Low Front.
6. Low Front Wide.

THIRD GROUP.—*Primary Round Vowels.*

Reading downwards we have:

First line.—1. Voice, Back small-aperture, Lip small-aperture. 2. Voice, Back mid-aperture, Lip mid-aperture. 3. Voice, Back large-aperture, Lip large-aperture.

Second line.—1. Voice, Back small-aperture, Front small-aperture, Lip small-aperture. 2. Voice, Back mid-aperture, Front mid-aperture, Lip mid-aperture. 3. Voice, Back large-aperture, Front large-aperture, Lip large-aperture.

Third line.—1. Voice, Front small-aperture, Lip small-aperture. 2. Voice, Front mid-aperture, Lip mid-aperture. 3. Voice, Front large-aperture, Lip large-aperture.

The labial apertures described are of a rounded form, but, as the pupils can see for themselves the shape of the labial apertures, it has not been considered necessary to give them a distinct sign for a rounded aperture; they simply describe the size of aperture by the separation of finger and thumb.

FOURTH GROUP.—*Wide Round Vowels.*

In teaching deaf children, the symbols of this group are considered as identical with those of Group III., and are described in a similar manner. The differences are explained later on. The symbols of Group IV. bear the same relation to those of Group III., that the symbols of Group II. bear to those of Group I. (See note above relating to Group II.)

CHART VI.

Chart VI. shows the mechanism of the English consonants as explained to the deaf.

First line:

(1) "Lip shut," followed by "a puff of air." We have here two symbols, the first of which (Lip shut), represents *p*, as in *put, cup*, etc. It is not advisable to teach "shut" consonants as separate elements. They are best taught in connection with vowels. The most elementary form of *p* taught, is the final *p*, as in *cup*, where the "Lip shut" position is followed by a puff of air, as shown in the Chart.

(2) "Lip shut, Voice," followed by "voice." The first of these symbols (Lip shut, voice), represents *b* in *but, cub*, etc. This is not taught elementarily, but in connection with a vowel. The simplest form is that shown in the Chart where the "Lip shut, Voice" position is followed by an indefinite murmur of voice, forming a syllable somewhat like *bir* in *bird*.

(3) "Lip shut, Voice, Nose," represents *m* in *man, come*, etc.

(4) "Lip divided-aperture," represents *f* in *fie, luff*, etc. The upper organ in this case is the edge of the teeth, instead of the upper lip.

Second line:

(1) "Point shut," followed by "a puff of air." The first symbol (Point shut), represents *t*, as in *to*, *not*, etc. When *t* occurs as a final letter, as in *not*, the "Point shut" position is followed by a puff of air, as shown in the Chart.

(2) "Point shut, Voice," followed by "Voice." The first symbol (Point shut, Voice), represents *d*, as in *do*, *nod*, etc. In the symbols shown in the Chart, the "Point shut Voice" position is followed by an indefinite murmur of voice, thus representing a syllable somewhat like *dir* in *dirk*.

(3) "Point shut, Voice, Nose" represents *n*, as in *no*, *nun*, etc.

(4) "Lip divided-aperture, Voice" represents *v*, as in *vie*, *love*, etc.

Third line:

(1) "Back shut" followed by "a puff of air." The first symbol (Back shut), represents k, as in *key*, *sick*, etc. When *k* occurs as a final letter, as in *sick*, the "Back shut" position is followed by a puff of air, as shown in the Chart.

(2) "Back shut, Voice," followed by "Voice." The first of these symbols (Back shut, Voice), represents *g*, as in *go*, *log*, etc. The "Back shut, Voice" position is followed by an indefinite murmur of Voice, forming a syllable somewhat like *gir* in *girl*.

(3) "Back shut Voice, Nose" represents *ng*, as in *lung*, *tongue*, etc.

(4) "Lip centre-aperture, Back centre-aperture" represents *wh*, as in *whet*. It is taught to the deaf as "Back centre-aperture" (German *ch*), with the lips rounded as in the act of whistling. In obtaining this sound from a deaf child, it is found essential to direct attention to the "Back centre-aperture position."

Fourth line:

(1) "Point divided-aperture, Voice" represents *l*, as in *lull*.

(2) "Point divided-aperture, Front centre-aperture" represents *th*, as in *thin*, *kith*, etc.

(3) "Point divided-aperture, Front centre-aperture, Voice" represents *th* as in *then*, *with*, etc.

(4) "Lip centre-aperture, Back centre-aperture, Voice" represents *w* in the word *wet*. In teaching the deaf it is essential to direct attention to the "Back centre-aperture" position, and the sound is taught as identical with the vowel *oo* in *pool*.

Fifth line:

(1) "Point centre-aperture, Front centre-aperture" represents *s*, as in *sown*, *hiss*, etc.

(2) "Point centre-aperture, Front centre-aperture, Voice" represents ʒ in *ʒone*, and *s* in *his*.

(3) "Front centre-aperture, Point centre-aperture" represents *sh*, as in *she*, and *s*, in *assure*. It also occurs after "Point shut" in such a word as *church* (tshurtsh).

(4) "Front centre-aperture, Point centre-aperture, Voice" represents *s* in *measure*, and ʒ in *aʒure*. It is heard in *j* and in *g* soft, after "Point shut Voice" in such a word as *judge* (dzhudzh).

Sixth line:

(1) "Front centre-aperture" represents the sound given to *h* in *hue*, for which we have no letter. As it is the non-vocal form of the consonant *y*, it may be represented by *yh*. It also occurs after non-vocal consonants, as in *few* (f*yh*oo), *tune* (t*yh*oon), *cue* (k*yh*oo).

(2) "Front centre-aperture, Voice" represents *y* in the word *you*. In teaching the deaf it is considered as identical with the vowel *e*.

(3) "Point centre-aperture." This sound has no letter, and may be represented by *rh*, as it is the non-vocal form of *r*. The deaf are taught that the letter *r* has this sound when it comes after a non-vocal consonant, as in *pry* (p*rh*y), *try* (t*rh*y), *cry* (c*rh*y).

(4) "Point centre-aperture, Voice" represents *r* in such a word as *run*, also *r* after a vocal consonant, as *bride*, *dry*, etc.

Seventh line: "Throat large-aperture" represents *h* in such words as *heat*, *hit*, *hate*, *head*, *hat*, *hoot*, *hook*, *hope*, *hall*, *hot*, *half*. *hurl*, *hut*, *high*, *how*, *hoist*, etc.

CHART VII.

The symbols in Chart VII. represent the positions for English vowel sounds.

First line:

(1) "High Back Wide, Round" represents the vowel heard in the following words: *foot*, *put*, etc.

(2) "High Back, Round" represents the vowel heard in *pool*, *move*, *through*, *true*, *flew*, etc.

(3) "High Front represents the vowel heard in *eel*, *eat*, *field*, *key*, *seiʒe*, etc.

(4) "High Front Wide" represents the vowel heard in *ill*, *build*, etc.

Second line:

(1) "Mid Back, Round," followed by a glide towards "High Back, Round," represents the diphthongal vowel heard in *pole, coal, soul, dough, bowl,* etc.

(2) "Mid Front," followed by a glide towards "High Front," represents the diphthongal vowel heard in *ale, ail, eight, great, say, they,* etc.

Third line:

(1) "Low Back Wide, Round" represents the vowel heard in *doll, what,* etc.

(2) "Low Back, Round" represents the vowel heard in *all, paul, paw, thought,* etc.

(3) "Low Front" represents the vowel heard in *shell, head, said,* etc.

(4) "Low Front Wide" represents the vowel heard in *shall, hat, can, and,* etc.

Fourth line:

(1) "Low Back Wide" represents the vowel heard in *ah, father,* etc.

(2) "Mid Back Wide" represents the vowel heard in *ask, path,* etc.

(3) "Low Mixed Wide" represents the vowel heard in *her, pearl, girl, fur,* etc.

(4) "Mid Back" represents the vowel heard in *gull, come, rough,* etc.

Fifth line:

(1) "Mid Back Wide," followed by a glide towards "High Front," represents the diphthongal vowel heard in *pile, sleight, buy, eye,* etc.

(2) "Mid Back Wide," followed by a glide towards "High Back Round," represents the diphthongal vowel heard in *cow, bough, round,* etc.

(3) "Low Back Round," followed by a glide towards "High Front," represents the diphthongal vowel heard in *oil, boy,* etc.

The sound of *h* only occurs before a vowel, and it is advisable to give the deaf pupil the idea that there are as many sounds of *h* as there are vowel sounds. Defective pronunciation results from the attempt to give a uniform value to the sound. The deaf pupil is taught that the mouth position for *h* is always the same as that of the succeeding vowel; in fact, that *h* is the *breath form* of the succeeding vowel. For example: Contrast the *h* in *he,* with that in

who (hoo). In the former case the mouth position for *h* is the same as that for the vowel *ee*, in the latter it is the same as that for the vowel *oo*.

Questions following Lecture IV:

MR. LYON: Do you describe the word "Mixed?

DR. BELL: We do not use the word "Mixed" in teaching the deaf, but describe in detail the positions that are mixed. Thus, we describe my father's "Lip-mixed" consonant as "Lip centre-aperture, Back centre-aperture.

DR. WILLIAMS: What do you mean by "divided-aperture?"

DR. BELL: An aperture divided in the middle so as to leave two orifices. For example: In assuming the position for the letter *l* (ω), the point of the tongue is placed against the upper gum, and the air passes out over both sides of the tongue.

QUESTION: What does the word "point" as you use it mean?

DR. BELL: It means the point of the tongue.

MR. CROUTER: How do you determine the order in which you shall read these, or does it make any difference?

DR. BELL: As the positions described are simultaneously assumed, the order of description is not material. Still, I think it a good plan to adopt some regular order. The symbol for *m*, might be described as "Lip shut, Nose, Voice," but I prefer to say, "Lip shut, Voice, Nose," because the voice is passed through the nose, and not the nose through the voice. As a matter of fact, the symbols do not represent either the voice or the nose, but positions of the soft palate and larynx which are simultaneously assumed. Of course you have to begin somewhere and describe the parts successively just as you do in describing the parts of a picture. The order of description, however, is immaterial, and a mere matter of convenience.

MR. CROUTER: I would like to ask whether a person can realize by any feeling the muscular condition represented by your symbols?

DR. BELL: Certainly. Familiarity with the organs through the use of a mirror leads to a perception of muscular feeling of the positions assumed by the vocal organs. Indeed, in talking we are all guided more or less by muscular feeling. For example, we can talk without making any noise so that a deaf pupil can understand what we say by watching the mouth. How do we know that our

vocal organs are in the correct position when we make no sound? Surely by muscular feeling. The deaf child also, through training, becomes conscious of the movements of his vocal organs and can tell by muscular feeling exactly what he does.

MR. LYON: Why do you begin with lip positions instead of back positions?

DR. BELL: The lip positions are the most visible. The deaf child understands what the symbols mean when applied to the lips, because he can see the positions assumed. This knowledge he applies to the interior positions that cannot be so easily seen.

THE PRESIDENT: The next lecture on our programme is on the method of teaching articulation and lip-reading at Northampton, by Miss Yale.

METHOD OF ARTICULATION TEACHING IN THE CLARKE INSTITUTION.

TUESDAY, JULY 7, 1891.—10 A. M.

EARLY WORK.

We have been requested to detail somewhat minutely the method employed at Northampton in the special work of teaching speech and speech-reading. We do not lay claim to novel methods nor are we committed to any unchangeable order of work. Such system as we have, has grown out of a careful consideration of the needs of our pupils through a period of nearly twenty-five years. We have endeavored to profit by our failures, as well as, by our successes, and we have come to this first meeting of this Association in the strong hope of being shown better ways to do many things, over which we have blundered sorely.

In the classification of entering pupils, children having lost hearing before speech was acquired, and those having entirely lost speech once possessed, are with us ranked with the congenitably deaf. Semi-mutes seldom enter the lowest classes. Any power of hearing is cultivated not only for its own value but also for its effect on speech and mental development. Tests of hearing are applied soon after a pupil enters school and the degree and kind of hearing which he possesses ascertained. For some years the number of pupils asking entrance to our school has been so large that we have urged the parents of the very little ones to retain them at home until seven or eight years of age, except in cases where some remnant of previous speech was in danger of being lost by delay. Most parents prefer to wait until the child is really out of babyhood before sending it from home, and, therefore, unless two or more entering classes are formed the younger pupils are put to great disadvantage in the constant comparison of their work with that of the older members of the class.

To begin instruction in Articulation on the first day of a child's entrance into a schoolroom, might, in individual cases, be wise, but

not we think with the majority of pupils. The first work of the teacher of a class of young deaf children is to gain their confidence and to convince them that her only purpose is to help them to have a really good time—that school is going to be the brightest, happiest, busiest place they have ever known. For a fortnight, sometimes longer, the teacher of our entering class spends the hours of school in such way as to accomplish this, meanwhile, also, accomplishing more scholarly but not more humane ends in securing attention and cultivating observation and imitation. Simple calisthenic exercises and exercises based on kindergarten occupations fill the day. Simple games such as tossing ball ; playing bean bags, and dropping the handkerchief are employed, also building blocks and dissected pictures, and pictures for matching. No single exercise continues many minutes, and so the dullest are kept interested and attentive. May I read from our outline of work for those days.

Exercises in *motion* in imitation of teacher.

1. Class movements in unison—walking, running, stopping, standing, sitting, &c.
2. Gymnastics of arms, hands, feet, mouth, &c.

Attention directed to the perception of *color.*

1. Match colors (use sets of objects exactly alike except in color) cards, blocks, strips of paper, &c.
2. Match colors in different objects—use color chart.
3. Color pictures—use pencils or paints.

Form to be recognized by *sight.*

a. Surfaces.
   1. Reproduce outlines of simple forms on blackboard—square, cross, circle, &c.
   2. Laying sticks, slats and rings.
   3. Kindergarten drawing.
   4. Writing—letters and combinations.

b. Solids.
   1. Marbles or blocks—size.
   2. Geometric solids—shape.
   3. Slats and sticks—length.

Numbers.

1. Pupils show same number of balls as that previously shown by teacher.
2. Teacher indicate number by balls on abacus or spots on blocks or dominoes, and pupils sbow the same number of objects.

Touch.

1. Solids (see form), recognized by touch only—pupils blindfolded.
2. Let small objects be seen, then selected by touch.
3. Let object be felt, then selected by sight.
4. Vibrations of strings by various musical instruments.
5. Reproduce different vibrations in larynx, nose, cheeks, &c.

Perception of Weight.

Use objects of similar size but of different weight.

In these exercises let the teacher be sure that she keeps clearly before her own mind the purpose of each step, and never lets the interest in any one flag. The children are thus made ready in body and mind for close attention, which is now directed to the organs of speech by gymnastics of the face and tongue.

Gymnastics of the Face.

1. Opening and shutting of the mouth and eyes, rapid opening and shutting of the lips, &c., moving lower jaw.
2. Putting lips in position for consonants and vowels (without breath or voice.

Gmynastics of the tongue

1. Thrusting it far out and drawing it back quickly, afterward pushing it out and drawing it back slowly.
2. Opening and shutting the point, front, and back.
3. Shutting these parts and holding the position.
4. Turning up and back the point of the tongue and applying it to different points on the roof of the mouth and lips.
5. Turning point down behind lower teeth.
6. Flapping the point as in saying la, la, with force.
7. Widening and narrowing the tongue by use of side muscles.
8. Keeping the tongue flat and perfectly still.

At other times during the day simple breathing exercises are practiced. The attention of the pupils has been attracted to the vibrations in the teacher's throat and their reproduction of these has reproduced voice. When a part or all of this work is done the teacher has become somewhat familiar with the ability of the pupils —they have gained confidence in her and in themselves. Little by little play grows less and work increases, but the work is never irksome. General gymnastic movements have become movements of the tongue and lips; attention has been concentrated more and more upon the organs of speech; observation of form has become confined

to the action of these organs, and skill of hand has been gained sufficient to enable the pupils to imitate the forms of script letters. Thus the little people are prepared for real work in speech and writing. From the first, all common directions are given through lip-reading.

The element method has always been and still is strongly adhered to, and in order that the action of the vocal organs may make the first and strongest impression rather than the form of the written or printed character, the position for the sound to be taught is given by the teacher and repeated by the pupil again and again, and only when this is done readily, is the written character given and the pupil shown that this is the sign or symbol of the already familiar action of the vocal organs. We begin at once the building up of a chart for encouragement and constant review. It is very likely only a sheet of brown paper with the script letters put on, one at a time, as they are gained, but it is to the little people the measure of work done, not as a full chart would be to them the measure of work undone. When the charts thus slowly built up are completed they stand (in script) exact reproductions of the primary groups on these charts.

CONSONANT SOUNDS.*

h—					
wh	w—				
p	b	m			
t	d	n	l	r	
k	g	ng			
ck					
c (ca, co, cu)					
f	v				
ph					
th	th				
s	z				
c (ce, ci, cy)	s				
sh	zh	y			
ch	j	(x=ks)	(qu=kwh)		
tch	g——				
	——ge				
	dge				

VOWEL SOUNDS.*

oo[1]	oo[2]	o–e	aw	–o–
(r)u–e		oa	au	
(r)ew		——o	o(r)	
		ow[2]		
ee	–i–	a–e	–e–	–a–
–e		ai	——y	
ea[1]		ay	ea[2]	
e–e				
	a(r)	–u–	ur	
		——a	er	
		——a(r)	ir	
		——o(r)		
		——re=er		
		——ir		

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a–e	i–e	o–e	ou	oi	u–e
ai	igh	oa	ow[1]	oy	ew
ay	–y	——o			
		ow[2]			

A consonant followed by a dash denotes that the sound represented is that of this letter in an initial position, as *w*— j—. The breath consonants occupy the first column, and their corresponding vocal equivalents the second. Numbers are added where the same letter or letters represents two sounds. The nasal consonants follow, and the two remaining point consonants. On the vowel chart, which indicates primarily the most general rules for the sounds of vowels in monosyllables, dashes indicate consonants. A vowel between two consonants as *a* in *hat* or *u* in *cup* is represented thus:——a–, –u–; while the long sound of *a*, as found in the words *hate*, *cape*, is written *a–e*, Secondary spellings cover other large classes of words, but generally not so large as those covered by the primary spellings. We have found the order of teaching sounds which brings the best results to be: First, breath consonants in the order of their difficulty; then a voice consonant and a vowel alternately, in the order of their difficulty.

* These two charts are modifications of those prepared by Miss Worcester, and presented by her at the convention in 1884.

The union of a consonant and a vowel—the consonant being placed first—is generally considered the simplest combination. We, however, frequently begin with combinations of breath consonants such as *fp*, *thp* and *sp*. As soon as the first vowel has been learned it is combined with the consonants previously taught and in as many ways as possible; as—

par-far

parpar-farfar

arp-arf

parp-farf

parf-farp

The pupils are at once taught the meaning of the dashes on the charts, i. e., are led to see the difference between *fat* and *fate* by application of the formulas *-a-* and *a-e* given on the chart—the pupils themselves filling these blanks. The elements at first are given slowly, one following the other without break. Gradually they are spoken more and more rapidly until they are given with the rapidity of ordinary speech. Stress should always be on the vowel. The great law of combination is that the positions do not follow but overlap each other, the position of one element being taken before that for the one preceding it has been actually relinquished. An accurate position should be secured for each element—not merely what seems an accurate sound—lest it prove defective in combination. *L*, *r*, *m*, and *n* after non-vocal consonants are themselves non-vocal. Pupils may be taught this as a principle, though we prefer, in general, to secure this result simply by rapid combination.

In teaching the pronunciation of words great care should be taken that each word be pronounced as a whole and with proper accent. No word should be considered learned until this is accomplished. Ungrouped sounds when uttered make no more intelligible words than ungrouped letters when printed on a page. Drill first on repititions of the same syllable as parpar; parpar; parparpar; parparpar; parparpar, &c. (Train the pupil to follow movements of the hand in indicating length of syllable.) When these can be readily accented let each form be placed at the head of a list of words to be similarly accented, thus:—

parpar	parpar
away	water
to-day	wafer
alone	paper

The division of sentences into clauses in such a way as to appeal to the eye, is a great help as to distinctness of articulation, as:— The man is tall. One boy had a knife, the other boy had a top. If the teacher is careful to clause words in this way it does affect to a considerable degree the speech of her pupils.

In regard to emphasis, "Clear thinking begets clear speaking." What has been said of the teacher's example in regard to clausing is true also in regard to emphasis. Natural speaking on the part of the teacher with no exaggeration, except that of length of pauses and force of accent, does much to make the speech of her deaf pupils less monotonous and lip-reading far easier. The effort on the part of the teacher, to articulate each element distinctly often destroys all expression, and makes her own speech exceedingly monotonous and unnecessarily unpleasant.

Speech-reading or lip-reading, cannot be taught by explanations and diagrams, but must be learned as piano playing is, by long, unremitting practice on the part of the pupil. It is certainly a far more valuable acquirement than the power of articulate utterance. It should be taught before and always with articulation. The more intelligent the pupil's understanding of positions, the easier will be the lip-reading of them. Especially in the earlier years, too much of the schoolroom work cannot be done by lip-reading. Slow, distinct, natural speech, without exaggeration, is best at the outset, but as soon as possible, the rapidity of speech should be increased to the ordinary rate. It hardly needs to be said that knowledge of language is as great an aid in the reading of the lips, as in the reading of the printed page. The point at which the pupil actually begins to use spoken words as an expression of thought, is, in general terms, the time when a certain amount of fluency has been gained in simple combinations; *i. e.*, when he has acquired ready use of the instrument of speech. We have become convinced that to make haste slowly is the wisest course to pursue. By the holidays each year we have begun the use of common words, as, but few, if any elements are at that time, unacquired, and many difficult combinations have been practiced.

Miss Kent: I would like to ask how soon the pupils can take sentences.

Miss Yale: That depends upon the pupils very largely. Sentences are given during the first half of the first school year. Before

the close of the year the pupils have acquired a vocabulary of from three hundred to eight hundred words.

MISS KENT: And they use them in sentences?

MISS YALE: Certainly. They put them into sentences as soon as they have the power to speak sentences. I would suggest that questions be left until after Miss Sparrow's paper to-morrow, as that may answer some that might be asked now.

THE PRESIDENT: Then we might take up the next paper on our programme. I will call upon Miss Fuller for a paper on "Infant Schools."

INFANT SCHOOLS FOR THE DEAF.

TUESDAY, JULY 7, 1891.—11.15 A. M.

The suggestion of an infant school came to me through seeing little children who had once heard and spoken brought to the Horace Mann School, deaf and dnmb.

In thinking over the irreparable loss which these children had sustained, and the advantages which hearing children have, before they are five years of age, it seemed to me not only desirable but very important, that some provision should be made for utilizing their early years.

To children who are born deaf also, these first years are of great value. The perceptive and imitative faculties are then more easily brought into requisition and trained than they can be at the school age.

I thought that if the conditions under which a little hearing child is taught to speak, could be given to our deaf children at the same age good results must follow.

On the 15th of June, 1888, a home for little children who cannot hear was opened at West Medford, Mass., with a fund raised for the purpose by Mrs. Francis Brooks. Children may be admitted to the home at the age of two and-a-half years. They are encouraged to use their voices, and are taught to mould the sounds which they make into speech, first naming familiar objects and gradually learning to form simple sentences expressing their little wants. These words and sentences seen upon the lips of their teacher soon become very familiar to them. The next step is the association of these words and sentences with their written forms. The curiosity of the child being roused by knowing that things have names, he is eager to add to his vocabulary. His toys are labelled, articles of

furniture have written names affixed to them, and slips of paper with the names of the different kinds of food upon the table are given to him. From these slips he can select the written word even before he is able to speak it, and thus indicate his wishes in regard to his food. Much of the instruction in speech, speech-reading, and written language is given through play and by exercises desiged to train the eye and hand, as well as to develop and quicken thought, The ordinary plays and games of little children are made the means by which the teacher presents again and again the words which must be learned through much repetition.

In notes made during the years 1889-90, of the progress of a little boy, three years of age, who came to the Home on the 21st of September, 1889, we find much to encourage a belief in the value of early, painstaking, careful instruction. I quote the following, Oct. 18: "He will say 'up' and point upward with his finger; Oct. 21st.: Tries to imitate the other children, moving his tongue up and down in his mouth; Oct. 24: He tries to make several vowel sounds, and follows the movements of the mouth very readily. Tried to say, 'boot,' Nov. 10; Frank tries very hard to say, 'ball' and 'out.' He is very fond of taking the objects and putting them *under, on*, or *into* something, as he sees the other children do, all the time making little sounds as if talking; Jan. 16th: He follows the movements of the mouth with great ease; May 12th: Says 'Arthur,' 'Eddie,' and 'Teddie,' very nicely. He knows the meaning of 'large,' and will place his hands in a position to show that he wants 'large' bread or cakes, saying at the same time 'lazh.' He talks continually, and often approaches the sound of words that have been frequently spoken to him."

Lena Driver, who was admitted to the Home, on the 3rd of May, 1889, has become a sweet, winning child. The illness that caused her loss of hearing, a few months before, left her in an extremely nervous, irritable condition, and this was without doubt aggravated by the sense of isolation that she felt in the strange silence. She heard no replies to her questions, and no response to her remarks. Since coming to the quiet, gentle influence that pervades the Home, the little rages that had baffled her mother's skill to check, have entirely ceased, and reports of her readiness to speak, to write and to read the speech of others, are found throughout the teacher's note-book. The untold benefits to little Lena of this tender care and constant teaching, make one wish that School Homes might be multiplied, so that all little children who become deaf may thus be

prevented from losing a knowledge of speech. Many cordial expressions of approval of the work going on in the Home have been received from the parents and friends of the pupils. A note from the father of a little one who had been with us but three months, says: "Wife and I thought a few words of thanks to express our gratitude for the progress our little boy is making at West Medford, were due you. We had him home some eight or nine days ago, and I cannot express in words, the joy it gave us to hear him say his first word."

The little Home is fortunate in having had from its beginning, a wise, loving, motherly woman to care for and instruct the children. Untiring in her devotion to them, she never wearies of encouraging them in their efforts to speak, and in talking with them. A skillful teacher from the Horace Mann School has made weekly visits to the Home during the past few months, and she speaks in the highest terms of the speech and speech-reading of the little ones, and of their loving sympathy with their teachers and with each other.

I have here a little book which was written soon after our Home was opened, and as it gives a very pleasant account of the Home, I have brought it with me, thinking it might interest some of you.

We have now in the Home eleven children. There are not accommodations for more and we do not desire to have over twelve children in our Home. Some inquiries have been made in regard to our taking them away from their homes. It was hoped that the families would come and live near the Home so that the children could have the benefit of the instruction given there; thus the work that was being done during regular hours could be supplemented at home. We try to alternate play hours with school work so as to make the school a real home to the children.

When our Home was first opened we took children over five years of age; but there were many applications from parents to receive children at a much earlier age. We do not now admit children after they are five years old.

One very pleasant incident that occurred last summer showed the appreciation of a parent who had every opportunity to note the work that was going on in the Home. A gentleman who has but one child, then four years old, living in the South, and who knew that the child could not be received into any institution, felt that something should be done for her education. He paid us a visit, and in a few weeks brought his little one to us, and she is now with us.

Our purpose is to give the little ones instruction which their parents cannot well impart.

MR. WESTERVELT: Do you find that a large number of the parents of your little children are able to supplement the work of the school so that it is an advantage to the children to go home, so that those who can get home influences are better off than those who are obliged to stay with you all the time?

MISS FULLER: We have had, I think, but two children who have lived at home. Now all remain with us as their homes are remote.

MR. WESTERVELT: Of the two who went to their homes, did you find that they made better progress than those who stayed in the school continuously?

MISS FULLER: The families lived near the Home but a short time, so I don't think I could judge of that; but I do know that where help of the parents is given, it is of great value to the children. We hope that in time families will come to live near us. The same thing is done in the case of other children in Boston. Families have removed to Boston for the sake of having their children at home while they are pursuing their studies.

MR. WESTERVELT: My question would hardly refer to such parents as give up their homes and move to Boston or such as give up their business and home life and move to other parts; but it would be rather with those parents whose homes are already there. Your Boston Day School may better serve to answer to my question.

MISS FULLER: The assistance given by parents to pupils in the Horace Mann School, is of great benefit.

MISS BLACK: Do you find that in a majority of cases parents do give their children that help?

MISS FULLER: I don't know that it is so in a majority of cases; but in a great many cases; some of those who have made the greatest progress have been helped by their parents. Perhaps they all do not help them directly with their studies, but when they find they can use speech, they talk with them. A boy came to us last September from an institution in Glasgow, Scotland. His mother is a Swede and cannot write or read English. When he came to us he knew nothing of speech, but showed a great desire to learn to speak and to read speech from the lips. A few days before the close of the school his mother came to see us and said she was very much gratified that he had learned to speak; she said, "It is everything to me, because I can't write."

MISS BLACK: I find there are exceptions. I have been principal of a day school in Rhode Island, and finding so many families that did not give their children that help, I preferred to have a boarding school, where I could have a more constant watch over them.

DR. GILLETT: You think they improve more rapidly in a boarding school than at their homes?

MISS BLACK: Yes, the majority of them.

DR. BELL: I would say that the subject of day schools and boarding schools in relation to oral work will come up specially for discussion. There is a great deal to be said on both sides, because in regard to oral work the difference of home is materially different from its influence upon any manual work, or general education.

MISS BLACK: While discussing the subject of the relation of boarding and day schools we should take up the subject of the education of children before the ordinary school age. I think there can be no doubt that a deaf child's education should be commenced in infancy, if possible. This experiment that has been started in West Medford is very interesting. There are strong objections to sending the little things away from home at so early an age. We want to consider both sides. The good thing about it is to get them under instruction before they have acquired habits of person or voice injurious to themselves and disagreeable to hearing people in general. Any organ of the body, as we all know, when not applied to its legitimate function is apt to become deformed from misuse, as well as inflexible and immobile from disuse. This is a subject that should be looked into very carefully. The best time, place and way to ground the little ones in good, practical, agreeable habits is the *magnum bonum* which we seek.

MR. KILPATRICK: Do I understand Miss Fuller to say that after she had the children in school for a while that she returns them to their homes, and if so at what time does she do this?

MISS FULLER: The plan is to allow them to remain until provision can be made for their education either at home or in other schools; some of the former pupils are now pupils of the Horace Mann School.

MR. KILPATRICK: I gather then that the intention is to keep them for a while, start them in their work and then either return them to their parents, or send them to a higher grade school.

MISS FULLER: The hope is that they will live in their homes as soon as they are old enough to go daily to the Horace Mann School. If their homes are too remote they enter institutions.

MISS MCCOWEN: I want to enquire what is the youngest age at which children are received?

MISS FULLER: I think three years is as early as we have taken any child. We are willing to take them at two and a half, but I think we have had none younger than three.

MISS MCCOWEN: May I ask how large a proportion are as young as three?

MISS FULLER: Only a few, the average age is between four and five.

MISS MCCOWEN: How many teachers have you at the Home?

MISS FULLER: We have a Principal who gives instruction, and one regular teacher, also two others who are teachers and attendants as well, We do not keep them in the schoolroom more than twenty minutes at a time. While one teacher takes the children into the play room, another gives special lessons in writing, speech reading, or in pronouncing words that they have already acquired.

MISS KENT: You have some class work?

MISS FULLER: Yes, when the children are old enough for it.

DR. FAY: How many other persons are employed besides the teachers and attendants?

MISS FULLER: I think there are three.

DR. FAY: Does that include the domestics?

MISS FULLER: Yes; all the washing and laundry work is done outside of the little cottage. The cottage is like many of the New England cottages. There is a large room in front which is our school room; another large room, corresponding to that and about the same size, is the living room, and from which the dining room opens. The house stands on a slope so that the kitchen is below the dining room.

DR. FAY: Is the principal the matron?

MISS FULLER: Yes; that is, she has the direction of everything pertaining to the household. The attendants are persons who are able to give instruction to the children and who utilize all the opportunities they have for teaching language. Last year we placed blackboard cloth upon the walls of the different rooms, that the attendants might write out what they say to the children.

DR. GILLETT: Have any parents brought their children to you, and afterwards felt the maternal instinct so strong that they must take them back home?

MISS FULLER: No; no one has been withdrawn for that reason.

MISS MCCOWEN: Do I understand you to say that some of the children from the Home had afterwards gone into your school?

MISS FULLER: Yes, four.

MISS MCCOWEN: In that case, was their progress more rapid, taking into consideration that they had had instruction before-hand? Did you notice they made more rapid progress entering at the age of six than those who entered at the same age and who had no instruction at the Home?

MISS FULLER: Yes; they were prepared to go on with the work of the second grade.

DR. GILLETT: How young do you receive children in the Horace Mann School?

MISS FULLER: We can receive them at five, but we do receive very few as early as that, because of the difficulty of sending them back and forth from their homes. The State of Massachusetts authorizes the appointment of children at the age of five.

DR. GILLETT: At what age did these children who had been in the Home School enter the Horace Mann School?

MISS FULLER: Between six and seven years. The last one to come was about seven. His father wanted to send him to me at an earlier age, but he could not arrange for him to go back and forth, and so he was sent to the Home School.

DR. GILLETT: How much further advanced was he than if he had entered the Horace Mann School at five?

MISS FULLER: Probably no further advanced. But had he not gone to the Home School he would have received no instruction until he was seven.

DR. GILLETT: That circumstance though has no bearing upon what the advancement of the child would have been if he had gone to the Horace Mann School at five years of age.

MISS FULLER: Could he have entered the Horace Mann School at five, I think he would have been equally advanced.

MISS HOBART: I think that the children who have come from the Home are much quicker in lip-reading. They are much more ready with their speech, it seems to me.

MR. BOOTH: I would like to ask Miss Fuller, as a matter of educational policy, ten years being the school term, would it be better that children come to school at two years of age and finish their school at twelve, or come to school at seven and finish at seventeen?

MISS FULLER: I believe in beginning the education of deaf children at the earliest possible age. We have not been able to keep

children ten years in our schools. A few years ago I was asked to give the average length of time the children spent in school. I found it was less than seven years, though provision is made for their attendance during ten years. Many of the pupils, both boys and girls, are allowed to leave school and go to work when they have been at school only a short time and have acquired but little language.

MR. BOOTH: But whatever that period may be, at what time in the child's life is it best to give that seven years; from two to nine, or from seven to fourteen?

MISS FULLER: I can't answer. I certainly think if the state allows hearing children to begin their education at the age of three that our little deaf children should begin as early.

MR. BOOTH: Yes, but the state not doing its duty in the matter, it rests with us to determine for the child the time that is best for him, or the period in his life in which he will secure the greatest benefit. Now, the question is, in what period of his life, the time being limited, can he receive the maximum of benefit?

MR. WESTERVELT: I would like to ask who it is that has fixed the limits of school attendance. It was originally four, then increased to six and to eight, and in Pennsylvania it has been extended to ten years. Who has fixed this limit?

MR. BOOTH: I don't know. The legislature in Pennsylvania has fixed the time for us.

MR. WESTERVELT: But why did the legislature extend it? Who induced them to do it? Has not this extension been due to the influence of teachers of the deaf?

MR. BOOTH: I think it has.

MR. WESTERVELT: Well, is it not then our duty to exercise our influence to secure a further change in the laws to authorize the extension of the term of schooling and the reception of children at three?

MR. BOOTH: We are compelled to accept the situation, and keep our pupils the prescribed time, though we may wish to keep them longer.

MR. WESTERVELT: But should we necessarily accept the situation? If it is desirable that hearing children should be admitted to school at three, is it not equally desirable that the deaf should? Does Miss Fuller think it desirable to admit children into our schools at a younger age than is now prescribed by the laws in most of the states?

MISS FULLER: I do. Perhaps a misapprehension has gone forth about the home. It is supported by voluntary contributions. We have not had help from the state, but it is a hopeful indication for the future that little kindergarten schools have sprung up in different parts of the city, and are recognized by the school board and supported just as other schools are. I want a similar recognition of the needs of our children.

DR. BELL: I would like to hear through members present who have had young deaf children under their care, what their experience has been, and then allow the discussion to go on. I would ask Miss McCowen to give us her experience with little children.

MISS MCCOWEN: I had not expected to give any special report of our work, but I am perfectly willing to answer questions. Our school has been in operation for eight years, and has been devoted to gathering together and teaching very young deaf children.

DR. BELL: How young children have you had?

MISS MCCOWEN: Although we have stated to the public that we were willing to receive children as young as two or two and-a-half years, so far we have been able to begin with none younger than three.

PROF. FAY: What is the average attendance?

MISS MCCOWEN: During the past year twenty-five. Our attendance for the last five years has been from twenty to twenty-five.

DR. GILLETT: What is the age of the oldest?

MISS MCCOWEN: The majority of our pupils are under nine, I have one of ten and one of eleven and another pupil of sixteen, and still another pupil, a young lady who is studying lip-reading, who is quite mature.

MISS HAMILTON: How many have you as young as three?

MISS MCCOWEN: I have none now. I have during six or seven years received only four pupils as young as three.

PROF. FAY: Do you encourage them to go to the state institution as soon as they are old enough?

MISS MCCOWEN: I should say as soon as old enough. Our school has only been established eight or nine years and we have labored under disadvantages, which I think oral schools suffer more from than manual; that is, that the children who do the best with us, approach so nearly the ease of conversation of their hearing brothers and sisters that their parents, if they can use the children, are much more apt to retain them at home.

MR. BOOTH: Does the state limit the time you may keep a pupil?

MISS MCCOWEN: My school is purely a private school and so is not limited in this matter by the state.

DR. GILLETT: The law of Illinois is from six to twenty-one, and applies to deaf children as well as any other.

PROF. FAY: The whole time between six and twenty-one?

DR. GILLETT: Yes, sir.

DR. BELL: Then your school is purely private?

MISS MCCOWEN: Yes, sir.

MR. CROUTER: So that all deaf children do not have the benefit of your oral school course?

MISS MCCOWEN: It is open to all who desire to avail themselves of its privileges. However, we prefer very young children or those who have not attended any other school. I can say of the children that we have received, none of them have had any hearing whatever. All of the pupils have happened to be children totally deaf from birth.

THE PRESIDENT: I think we would like to know whether you think it is wise to have such young children under instruction, and why?

MISS MCCOWEN: Well, it certainly is true that deaf children need as much instruction as hearing children. A little hearing child begins to learn at once unconsciously, necessarily, cannot avoid it; but the deaf child is cut off from this unconscious education entirely. My experience has led me to believe more and more earnestly that the deaf child should begin its intelligent instruction in babyhood; and that the child should in all waking hours have for a constant living companion, an intelligent teacher.

MR. BOOTH: Is it not a fact that these children being so young and having their minds so immature, get bad habits of pronunciation that are very difficult to correct afterwards?

MISS MCCOWEN: Well, my experience has been that the bad habits formed at home are harder to break up than any habit the child can acquire at school. There would be no inducement to carry on the school if we could not teach them more and better than they learn in their homes.

DR. FAY: Are any of your former pupils at the institution in Jacksonville now?

MISS MCCOWEN: I cannot say. There are some at the institution in Jacksonville who have been with me for a short time, at least

I think so. I remember one boy who came into my school. He was a boy who had enough hearing so that with his back turned he could hear twenty feet away. He would understand and repeat perfectly long sentences after me, but his habits were such that I felt the little good I might do him was more than counteracted by his influence in my school. Pupils from my school have gone out for different reasons into other schools. Parents remove to a locality which is more convenient to some other school, or perhaps become discouraged. This latter is never the case except with pupils who begin too late.

DR. FAY: Into the Chicago Deaf Mute School?

MISS MCCOWEN: None that I know of, though I really know very little about the Chicago Deaf Mute Schools.

DR. GILLETT: May I ask Miss McCowen what special provision she has for little children of three, four and five years of age, as to separating them from those of twelve, thirteen and fourteen? Are they associated in any way?

MISS MCGOWEN: They are associated in the dining-room and at certain times on the play ground; but their lessons are entirely separate. They are under the care of trained kindergarten teachers. Our idea is not to give the children in the beginning set lessons, but simply to give them something they will enjoy, and when there is an evident effort at speech the teacher is there to give the child an expression for that thought.

MISS HAMILTON: What is the attendance at your school?

MISS MCCOWEN: In the past year twenty-five. For the past five years from twenty to twenty-five.

MISS HAMILTON: How many teachers have you?

MISS MCCOWEN: I have six regular teachers and several pupil teachers.

MISS MCDOWELL: How many of these pupils have hearing that can be utilized?

MISS MCCOWEN: Of the twenty-five, only four pupils had any hearing that we could utilize; most of the others were born deaf. One child, and the very hardest one we had in the whole number to try to teach to talk, was a child who lost hearing when he was about three, I think. He came to us at five. Before his illness he was said to have had fluent speech but became totally deaf. Even "mamma" and "papa" were lost.

MISS MCDOWELL: Do you make an effort to cultivate hearing in your children?

MISS MCCOWEN: We do.

MR. CROUTER: Is Miss McCowen to give us a paper on this subject?

THE PRESIDENT: I will refer you to Miss Yale.

MISS YALE: According to the programme it will be considered on Thursday.

MISS MCCOWEN: We use largely the faculty of drawing; the very youngest children we have are taught to draw. We think it a great advantage in developing thought and cultivating a desire for language. We find children of four will draw pictures representing circumstances that have happened, and ask us for names to express it.

DR. GILLETT: I am very much interested in this question. I did not know, Mr. Chairman, we were to discuss infant schools for the deaf. This is a meeting to promote the teaching of speech to the deaf. I have some experience and some opinions in regard to the age at which children should be admitted to institutions and was about to speak of this; but thought perhaps I was going to discuss a point not in order.

DR. BELL: I think the aspect of the case to be considered here is: Do these infant schools promote the teaching of speech to the deaf?

DR. GILLETT: I have no experience on that point. We have had one exceptional case in our school. I was, through a misunderstanding, led to receive a little child into the school, considerably younger than I supposed she was. She was scarcely five years old when she entered the school. Miss Fay has had this child under instruction and I have asked her to tell us a little of what she has accomplished in that line.

MISS ADELIA C. FAY: In two years, the time she has been with us, she has accomplished a great deal. It seems to me she is on a level with those who have entered at eight. Her speech is perfectly intelligible and her lip-reading very good for a little child.

THE PRESIDENT: Is it helpful to the speech and speech-reading of a child to commence at a very young age; that is, at a younger age than they are usually admitted to schools?

MISS FAY: I think so.

MISS FULLER: I think we might hear what Dr. Gillett has to say on the subject; for anything he may have to say will certainly be of advantage to us to know.

DR. GILLETT: Well, I am really very much obliged. There is something I wanted to say because my heart is in this subject. What I am about to say is not in any sense to the effect that infant

schools will impede the acquisition of speech. I don't think they will. I think when a child is learning under proper instructors, early training is an advantage. I have had some little experience and observation with the deaf, and I may say that I felt a great deal more fully prepared to speak positively thirty years ago than I do now. I was taught to believe that a deaf child ought not to be admitted to school until twelve years old. Later my mind underwent a change so that I felt that ten years might be a suitable age, and then about eight, and pretty nearly rested there; but I have advanced a little further on. I had a very interesting experience some years ago. A gentleman brought a little deaf boy five years old to our school. He already had a little girl at our school and he brought the little boy also. I said to him it was useless to leave that little boy. He answered that the little fellow's mother had died during the summer and he did not know what to do with him, and was extremely anxious to leave him with us. I repeated that if he did we certainly could not teach him anything; that he might leave him and I would enter him on trial, and would see if he learned anything. If he did, all right, if not he would have to take him away. I had sixty-five new pupils that year who were divided into A, B and C grades. That little fellow took the first standing in the A grade out of the entire sixty-five, and he has maintained that position in every department he has been placed in from that day to this.

THE PRESIDENT: How old is he now?

DR. GILLETT: About fifteen. He is a little fellow still, but in his school and shop work and in his athletics he is as nearly a perfect model as I ever saw. Well, I have undergone a change of heart over that little fellow. His name is Asa Stutsman. I think I should have made a sad mistake if I had persistently refused to give that little boy a trial. I had a goodly number of cases where, when the parents who brought the child to us had forgotten his age, and subsequently I learned that there had been a mistake, and the child was several years younger than represented; but all these cases have turned out well without exception. I know of none not turning out well who were of a normal condition of mind. We have changed our practice within a few years; our Institution receives children quite young, and I see no bad effects from it.

DR. FAY: How young?

DR. GILLETT: As young as five years. I don't know that I would advise this as a rule, but there are certainly some cases where it is advisable.

MR. BOOTH: You can keep them fifteen years?

DR. GILLETT: Yes, There is no law to the contrary.

MR. BOOTH: Do you keep pupils so long?

DR. GILLETT: No, I have had them as long as thirteen years. Now if this is helpful in one class of instruction it must be helpful in another.

THE PRESIDENT: I think in this connection, as you have brought this subject up, it would be interesting to know a little of Mr. Westervelt's involuntary experiment in that line.

MR. WESTERVELT: I should be very glad to tell you about it. A little girl three years old came to visit a brother in the school last December, and as she was a bright child some of the teachers asked me to let her stay, and the child has stayed ever since with us. She was simply kept as a guest and a playmate for the little children. She has been, during some months past, perhaps since March, in some of the classes in the school, because she was learning and it seemed desirable to put her there. She picked up language by seeing the others use it, and would communicate what she wanted by wriggling her fingers. Of course, as this is a manual alphabet school, the child learned a good many words in that way. The first word she learned was "candy." She did not learn any word by the letters it was composed of but by the particular wriggle that made the word.

THE PRESIDENT: How do the teachers give her directions?

MR. WESTERVELT: By spelling on the hand. She does not write on paper as a rule, though she can do so. Spelling is just as easy to do, and she gets more words by seeing them on the fingers than on paper. She has also been taught to speak and she is acquiring quite a little facility in moving her lips and in getting the positions of elementary sounds. She is very pretty in her use of the Lyon Manual. We have had before this, three or four other quite young children, though none so young as three; and they were put into our Kindergarten. They were better off there than they would have been at home, and all have done well. I am glad to receive little children and think it is an advantage to get them as early as I can and have them stay as long as they can.

MISS MCCOWEN: I would like to enquire if beginning instruction at three, it would be wise to begin with breathing exercises or elements, or the word method?

MISS FULLER: I should say with the word method.

MISS MCCOWEN: That has been our habit, and after the young pupils have acquired a vocabulary of forty or fifty words, to give them all new words in sentences.

MISS FULLER: Perhaps I ought to say we work with the elementary sounds at the same time.

MISS BLACK: I have within the last year had a little pupil enter at three. I put her right in with the other little ones. She took breathing and physical exercises and also most of the elements; she is now four and is getting along nicely.

PROF. GORDON: Mr. President, I should like to ask a question to be answered by each person here who has had experience with such young children as we have under consideration. My question is not with regard to their progress in speech or their ability to utter speech. I should like to know whether it is not their experience that children learn to comprehend simple directions by watching the speaker's face before they can utter the words?

MISS FULLER: I think they do comprehend a great deal which they cannot speak.

MISS MCCOWEN: Lip-reading is their mother tongue, and like all hearing children, they acquire an understanding of their mother tongue much in advance of speech.

MISS BLACK: I agree with all that has been said. They learn to read from the lips a great many words they cannot speak; and I give them many little commands like "Come to me," "Open the door," etc., which they understand very well before they learn to speak.

MR. BOOTH: I would like to ask a question upon the restoration or revival of speech; if any of these teachers have had experience with pupils who lost hearing at two years, having acquired some speech, and were then taken to the school at three; if they have noticed that they have been able to restore or revive the speech that was lost?

MISS FULLER: We have repeatedly found that children recalled speech apparently lost. Language seems to come back to them as a thing dimly remembered. It is an interesting fact that a child who loses hearing at the age of one and-a-half years seems to have greater brain power than a child born deaf; the influence of hearing seems to have made certain impressions upon the brain power of the child.

MR. BOOTH: Do you think the sooner that this is utilized the better it is?

MISS FULLER: Yes, I certainly think so. I recall a girl who came to us at six. Her mother said that until the age of three she heard perfectly and was very precocious. She lost her hearing then and apparently lost all remembrance of speech. It seemed to be entirely obliterated. When she entered the school I believed she could be led to recall it, but she never did. We found this girl made greater progress than girls in the same class who were born deaf. For this reason we believe that her brain power was better than those of children who had never heard.

MRS. G. T. PRITCHARD: I have found that the little ones learn lip-reading faster than they learn to speak.

THE PRESIDENT: We would like to hear from Mr. Groesbeck as to the advisability of trying to restore speech as soon as possible after it is lost.

MR. GROESBECK: I hardly know what to say, Mr. President, because we had no way of knowing how much Ned understood. We knew he could understand quite a little. We found he caught something from our lips.

THE PRESIDENT: I think it would be useful if Mr. Fechheimer would tell us his experience.

MR. L. S. FECHHEIMER: We tried to teach our little boy when four years of age, and after a little while he began to speak.

THE PRESIDENT: How about understanding speech? Did he commence to understand speech before he spoke?

MR. FECHHEIMER: He understood the lips first, I remember the teacher showed several sentences written before he was able to speak.

THE PRESIDENT: I think that is a very important question, but I don't think that teachers of articulation realize sufficiently that speech and understanding speech are two distinct arts, and that a pupil may make very rapid progress in one and not in the other.

MR. WESTERVELT: Mrs. Fechheimer says it was not more than three weeks when her boy was able to follow her instruction.

THE PRESIDENT: Did you then try to do anything with him in speech?

MR. FECHHEIMER: We made unsuccessful efforts; he was not able to say anything.

MR. GROESBECK: That reminds me that with Ned we used to accompany lip motion with motion of the hand. I am a very firm believer that children should be taught just as soon as they can be. I think they should be put into schools when they cannot have a

private teacher. I think the private teacher at first is better because the child has the home life and influence.

THE PRESIDENT: I believe there is here a teacher from the Scranton Oral School, and I am sure that if she could give us some idea of infant schools we should be very glad to hear from her.

MISS BLACK: I would like to ask. There is a great deal said about children learning to talk before becoming deaf. I would ask, if you have not had the experience that it is sometimes more difficult to teach children when they have forgotten language than those who have never had any, and were born deaf.

MISS FULLER: I think it is often more difficult to correct faulty utterances than to develop new sounds.

MISS BLACK: Is not that a great argument in favor of receiving them young? I am not referring to children who are carefully taught, but you know there are a great many who have no careful teaching at home, and these are the ones we expect to benefit the most by these schools for very young children.

DR. GILLETT: I want to call attention to this point. If I understand correctly the greatest difficulty we have is to teach lip-reading. The majority of the deaf will learn to speak much more readily than they will learn to read the lips of others. Now if I have followed the discussion here it has been brought out that the time to teach lip-reading is at the very earliest years.

THE PRESIDENT: I think we may receive that as true from the unanimity with which it has been presented to us from so many teachers of the deaf. It is one that we may not have anticipated, but the teachers seem to be unanimous in their experience.

MISS BLACK: I have noticed this in grown people that have become deaf, but have never lost their speech. I meet with them here and there, and they talk fluently, but they are very poor speech-readers. I remember one in particular whom I urged again and again to learn speech-reading, but he said he could not master it.

MR. WESTERVELT: I must apologize for speaking of this matter. Mr. Werner, editor of the "Voice Magazine,' published a proceeding of the Third Convention of Articulation Teachers at his own expense. He has on hand quite a number of copies of the proceedings of that convention which met in 1884. Mr. Werner will be glad to make any profitable use of these reports and he offers them to members of the Association here who will write to him sending a six-cent postage stamp, to pay for return postage, with full address.

(Adjourned until 2.30 P. M.)

TUESDAY, JULY 7, 1891.—2.30 P. M.

MISS YALE: To illustrate what was said this morning of exercises preparatory to direct articulation work, we will take some children with whom we have never worked before.

THE PRESIDENT: I would like to make an announcement. We are favored to-day with the presence of Mr. William Robert Roe, Principal of the Midland Derby Institution for the Deaf and Dumb, England; and also Mrs. Roe. We welcome them to our association.

Miss Gawith then conducted an exercise with the children in matching colors, recognizing numbers, also recognition of form and surface by touch, which is one of the first steps toward teaching the child to perceive vibration in the throat and face. She also taught several elementary sounds.

MISS YALE: Our next paper will be by one of the teachers of the Horace Mann School: "Plan to Encourage Speech," by Miss Elsa L. Hobart.

MISS HOBART: I have used the following plan to encourage my pupils in their attempts to talk both at home and at school. Each child carries a little card and pencil in his pocket and whenever he tells some little incident forming the sentences correctly, he may ask mother, teacher or friend to make a mark for each correct sentence upon his card. If the sentence is not rightly constructed the first time, the mother will correct it, allowing the child to repeat it until he gives the whole sentence without help, when he may have the desired mark. The marks are arranged ten in each line to facilitate counting. This simple plan has been very helpful in the three classes in the Grammar department that I have taught. The pupils have made persistent efforts to express their thoughts in correct language where previously they might have been satisfied with a word instead of a sentence. The tendency of this exercise has been to increase their command of different forms of expression as mother and teacher have arranged badly expressed thoughts in whatever forms seemed most natural regardless of the previous knowledge of the child. The interest of the friends at home has been of the greatest value to pupils and teacher.

At the end of each month the cards have been collected and the marks, standing for well-formed spoken sentences, counted and recorded, and the children have had fresh cards for the next month. Several children have brought evidence of more than one thousand correct sentences spoken by them during the month, and any teacher who tries this plan will be conscious that however many marks she

has made upon a child's card, she has heard almost as many more sentences spoken by the child which lack of opportunity has prevented her from recording. Even the diffident children have made great efforts and have been rewarded by a fair measure of success.

After a time, this plan was tried in the primary department of our school with this difference, the pupils were not allowed to carry their cards home, and thus were marked only by their teachers, the sentences being spoken before school, at noon time, or during a half hour given especially for conversation. During the last four weeks of our school session a little boy in one of these younger classes had a record of two hundred and ninety-nine correctly-formed sentences, and the interest in the matter in all the classes was enough to make one feel that the work had been indeed worth the trouble it had cost.

One of the teachers of these primary classes wishing her class to continue the plan during the vacation has given them little note books and pencils like these, sending home such a note as the following to each pupil's mother:

At the beginning of our next school year I have planned to provide each pupil in my classes with two such books, one to be used at home and the other at school. At the end of each month the pupil will bring one book to school signed by his mother and carry the other book home signed by his teacher. A record will be kept of each month's results. Thus it will be possible to know more accurately how each child is progressing in his speech both at home and at school, and his improvement from month to month will be apparent to his mother, his teacher and to the child himself.

This little box contains the cards used by one of my classes during the past four months. They are worn and soiled by use. I shall be glad to pass them or the little book to anyone interested in the matter.

Miss Yale: Next comes a short paper by one of the teachers of the Horace Mann School, which Miss Fuller has promised to read: "The Blackboard as an Aid in the use of Spoken Language," by Miss Ida H. Adams:

Miss Adams: At the beginning of the school year one of the directions given to the teachers of the primary department was, that between quarter of nine and two o'clock everything said to the pupils or in their presence, should be written upon the blackboard. Very soon it was found too difficult to write out all that was said to others, but an earnest effort was made by the writer of this record to jot down all that was said to the pupils, and also whatever the pupils themselves said was written either by themselves or by the teacher. The pleasure of the children in all this is a point to be noted. As they came dropping in from half-past eight to nine it was delightful

to observe how eagerly each read what was already written before he unburdened his own mind; how the questions flew thick and fast to satisfy the desire for more particulars as to the event already recorded. Having made it a rule that answers would be given to correctly framed and carefully spoken sentences only, the children became very expert in instantly committing to memory the questions which had been written out from their single words and natural gestures; the written answer was the reward and quite enough too. Any statement expressing a thought, experience or observation of the children's own giving was committed to memory on the spot and recited orally, the imperfectly pronounced words being listed for practice at a regular articulation drill period. The desire to have as few words as possible in this list was a great incentive to careful pronunciation. To this may be attributed the marked improvement in speech. This is one way the blackboard aided spoken language. Another result followed the constant jotting of ejaculations, phrases and remarks which are so often thrown into regular conversation, in that the children became so familiar with them that they used them quite unconsciously. It was a pleasure to hear a very slow girl, one who has been outstripped by many a younger child, wake up to a use of "Let me see!" "Never mind!" "It's all right." "I think so." "Perhaps." "What for?" and similar odds and ends of conversation. Indeed, the most remarkable point about this whole business of writing is the effect it had upon some dull pupils. Their appreciation of written language was greatly increased, their ability to memorize quickly and speak distinctly was also greatly increased. Their use of bits of talk such as has been mentioned, (please understand, not Helen Hunt Jackson's delightful collection,) was almost as delightful in its way, and as far as it went, as her's, because they were thrown in in the most natural, unconscious way. In this Association, it is understood when children's use of language is mentioned, spoken language is meant. The poor, heavy, slow children are such a weight on a teacher, they cause her so much care and anxiety that any plan which will arouse, interest and help them is worth considering and trying. Bright, quick children will learn almost in spite of a teacher, but the dull ones need more, and get more usually, though the extra work and help that are bestowed upon them do not show in the results as they would if the bright ones received them, yet a conscientious teacher can but try and try, only to be baffled again and again by the thick maze of confusion caused by inability to understand,

and resulting in indifference or a hopeless, helpless plodding or floundering in that maze so disheartening to a teacher. But it was noticed, that while all gained in the points that have been mentioned, there was no gain in lip-reading. The children would say "*Write*" when a question was asked, seemingly being dependent upon the blackboard and not upon the lips. As it is well known that the key to lip-reading is a knowledge of the language, it may be inferred that the ability to read the lips will come with a more extended knowledge, and what better way to give it than this? You may say it is open to the objection that it is not a systematic, step-by-step, from simple to difficult sentences method of giving a knowledge of language. Did ever any hearing child learn to speak by being taught so? Do adults, learning a foreign language, get a working use of it in any other way than by using it in conversation at every opportunity? Another objection is that the time spent in writing every word spoken to the pupils had to be often taken out of that allowed for the regular lessons, and they suffered in consequence. But to this it may be said that the regular lessons suffer from the pupil's inability to understand a spoken or written direction; then, in the long run, which will be of more service, an intelligent use of every-day language or an ability to work along school lines more or less well? We have confidence that we shall come out right, because our plan is based upon natural methods which arouse and interest all, even and especially the dull ones, who are so often left behind in climbing the hill of language. They are just as curious to know about people and things, but it is difficult, perhaps, for them to memorize, to imagine or to reason. Gratifying their curiosity leads to these other results. As, when they ask, "How much did your boots cost?" they must memorize the question and recite it orally before they can know the price they are so curious to learn. Or, when they ask, "Why were you late this morning?" they must imagine themselves in my place waiting for a long delayed train to appear. Any question, however personal, was cheerfully, gladly answered, though the caution that some questions must never be asked of persons not their mothers or teachers was always most carefully observed by them. The children have as strong a desire to relate their own experiences, as to know about the experiences of others, and having found that well constructed sentences gave me a clearer idea of what was in their minds to tell me, the effort to make me understand, resulted in a steady improvement in their little tales,

especially as each sentence was committed as fast as it was written out. Though stated times for conversation were provided, during which the pupils were encouraged to ask questions, or volunteer statements, yet a large part of this work was done at odd times, such as before nine o'clock, after lunch and after dismissal, and at any time during a lesson whenever there was something to say, it was written as well as said. We feel that the work has paid because of the pleasure the children have enjoyed, the improvement in articulation, the increased appreciation of written language and the greater ability to express their thoughts in writing as well as speech. We regret that lip-reading was side-tracked, but hope it will run all the better at a later time, because of the increased knowledge of language, both written and spoken, obtained by the use of the blackboard as an aid.

MR. BOOTH: I remember Prof. Binner made a point the other day, that he insisted upon his pupils answering questions in full. I should like to know if that is generally practiced in oral schools. I should like to ask of representatives from the several oral schools, more especially teachers in the lower grades, if they insist on questions being answered in full.

MISS FULLER: In the youngest classes in the Horace Mann School, we encourage the pupils to give the simplest answer possible; because in getting the full answer the point may be lost. We give the simplest questions, and if they can be answered by yes, or no, it is sufficient. Then as they advance to higher classes we encourage them to answer more fully.

MR. BINNER: I think if we sift the matter right down, that Miss Fuller and I, and many others, are doing the same thing. I think Miss Fuller will be found to give her children language just as far as they are able to use it. I think that is the point. For instance, if I have a first year's pupil and I point to a hat and say "what is that;" I don't expect the child to answer "that is a hat," if he says "hat," I am satisfied.

MISS YALE: We give both forms of answers; having the children give the short answer, and also the full answer.

MISS MCCOWEN: At the start we are satisfied with one word as an answer; but as the children get the idea of sentences as expressing a complete thought, we expect all answers to be in complete sentences; and when the time has arrived at which the child has some fluency in language then we begin to substitute the abbreviated form.

MISS MCDOWELL: At first we have complete answers and to be perfectly sure they understand the point of the question I should be very apt to ask other questions.

THE PRESIDENT: Are there any other schools represented here that have a different method?

MR. BOOTH: The reason I ask the question is, because the practice in the Philadelphia school differs from the practice of Prof. Binner. We insist upon short answers to questions.

THE PRESIDENT: Then in your classes if you ask a boy: "What is your name;" would you have him answer: "My name is John Brown," or simply "John Brown?"

MR. BOOTH; Simply "John Brown," which is the complete answer to the question.

MR. BINNER: If a child has not language enough I can't expect him to use complete sentences. I am glad to get anything; but as the child goes on I want him to say "My name is John Brown."

MR. GROESBECK: Why not have the child answer as the hearing child does? My idea is to make the child talk as simply as the hearing child. You would never find a hearing child answering such a question, "My name is John Brown;" he would simply say "John Brown." Never have them use artificial forms of speech.

MR. BINNER: Teaching language is the most difficult part of our work, but I find that the method I pursue aids in overcoming the difficulties. Perhaps Mr. Groesbeck was not present when I made the statement in connection with this that when the pupils get beyond a certain course I do not expect them to give me only complete sentences any longer. They have sufficient language, and it is then part of the language exercises to employ short answers. The first few years, however, I insist upon complete sentences in order to inculcate a correct and vivid idea of the meaning and the use of language.

DR. BELL: If there are no questions I shall show how the visible speech symbols are taught to beginners. I should like to have as many children as possible on the platform so as to form a class.

[Dr. Bell here showed his method of explaining the meaning of the symbols to young deaf children by teaching a class upon the platform].

DR. BELL then said: Now in teaching a deaf child you present to him the symbol for some difficult sound. If he has been taught to analyze the symbols in the manner shown, the symbol conveys to

his mind a direction what to do with his mouth. That is what your pupil has to aim at, but in ninety-nine cases out of a hundred he may not get it, at least at the first shot. Now what are you going to do? Are you going to say "No, no! that's not right. Try again?" Let him try once more and the chances are that he fails again to give the sound intended. The No-No method only aggravates the difficulty by discouraging the pupil and disgusting him with articulation.

Learning to speak is like learning to shoot. Now, suppose you aim at a target for the first time, and fail to hit it, and you are simply told "No, no; that's not right. Try again." Well, suppose you do try again. The chances are that you fail, and if you were simply told once more that you didn't hit the bull's eye, you are no further advanced than you were before, That's not the way to learn to shoot. You must know *where your bullet struck when you failed*, so as to see the relation between the point struck and the point you intended to hit. The knowledge of that relation will guide your next shot. For example: If you know that you hit too far to the right, why your next shot is aimed more to the left, and perhaps flies clear of the target on the other side. If, then, you are told the result of this shot also, you make due allowances the next time you try. You may fail a hundred times. Now you go a little to the right, now a little to the left, sometimes too high, sometimes too low; but your knowledge of the effect of each shot causes you to make unconscious allowances, so that, little by little, you come nearer to the bull's eye until at last you hit it. When you can hit the bull's eye every time, you have mastered your instrument—the gun—and can hit any other bull's eye with equal ease.

The No-No method, besides discouraging the beginner fails to give the very information that is necessary for his progress. The deaf child must know *what he did when he failed*, and the relation of the position struck to the bull's eye. The knowledge of that relation will guide him in his next attempt. For example: If he knows that his tongue was too far forward in the mouth, in his next attempt he aims at having his tongue further back and probably gets too far in that direction. If, then, he is told the result of this attempt also, he makes due allowances the next time he tries. He may fail a hundred times. Now the position may be a little too far forward, now a little too far back, or the tongue may be too high or too low, but his knowledge of the effect of each effort causes him to approach more and more closely to the exact position desired, till

at last he gets it. The time spent in studying and representing the incorrect positions is not wasted, for it gives the pupil mastery over the instrument of speech itself, and the struggle to get exactitude of position with one difficult sound gives him power to get any other, just as the ability to hit one bull's eye qualifies a man to shoot at any mark.

MISS YALE: Now will be a good time to gather the pupils on the piazza, so that questions may be asked of the teachers in regard to them.

(*The meeting then adiourned until 9:30 a. m. the following morning.*)

An entertainment for the children was given in the hotel parlor in the evening.

PAVILION AT CROSBYSIDE—LAKE GEORGE.

HISTORY OF ORAL WORK IN THE PENNSYLVANIA INSTITUTE.

WEDNESDAY, JULY, 8, 1891.—9.30 A. M.

In the absence of the President, the Secretary called the meeting to order, and announced an address by Mr. Crouter.

MR. CROUTER: MR. PRESIDENT, LADIES AND GENTLEMEN: In institutions that have been long established, substantial changes are not readily or rapidly effected; they come slowly, gradually, almost unnoticeably; by peaceful and moral agencies for the most part, but sometimes, alas, by violence, by the force of arms, by the crash of war and the shedding of blood.

This is true of every department of human activity; in modes of travel, in methods of transacting business, in the establishment of forms of government, and in the creation and maintenance of religious and educational systems. The mind of man is, by nature, conservative, it clings tenaciously to the known, to what is, and hesitates and fears to forsake the old for the new, to leap from the known to the unknown, It is, in part at least, on account of this natural tendency, that we find to-day, in most of our oldest schools for the deaf, a strong adherence to methods of instruction long since established, methods which it must be acknowledged have been, and still are, productive of great and permanent good, and a reluctance to adopt new and untried methods in the instruction of their pupils.

Friends of new methods must not grow impatient if their theories and practices be not immediately received and set in operation in these schools, nor if the changes in methods now undoubtedly going on, seem slow and tedious. So far as the teaching of articulation is concerned there is reason for much encouragement. One year

ago, this meeting itself, largely attended as it is, by representatives from over thirty schools would have been deemed an utter impossibility, and if there be anything at all in the logic of events, the improvement in deaf-mute instruction in this country during the past twenty-five years, will be repeated with greatly augmented force in the twenty-five years to come; indeed, it may safely be predicted that the teacher is here to-day who will live to look back with wonder and amazement upon the slow, imperfect methods of the present time.

The history of the changes that have been effected, slowly and gradually, and therefore permanently, in the Pennsylvania Institution for the Deaf and Dumb during the past twenty years may prove suggestive in this connection. Allow me briefly to trace their most salient features.

Prior to 1870, the system of instruction pursued was that of the sign or manual system, introduced by Laurent Clerc, one of the famous pupils of Sicard, who was induced by Thomas H. Gallaudet to accompany him to America to assist in establishing the American Asylum at Hartford, Connecticut.

For fifty years (the Institution was founded in 1820) no other method was practiced, no other was believed possible. During all this period, pupils partially deaf and those who had lost their hearing but retained in greater or less degree their powers of speech, were treated in all respects as those born deaf. They were placed, greatly to their mutual detriment, in the same classes and taught in the same manner. Their progress in written language and in other branches of study was good, at times, in special cases, surprising, but no attempt was made to develop or improve their powers of speech. No one seemed to think such instruction necessary, the subject was passed over as one of little or no importance, and as a result in most cases the semi-mutes became entirely mute and the semi-deaf totally deaf.

About the year 1865 the attention of educators and philanthropists began seriously to be directed toward the methods of instruction pursued in Europe, especially in Germany. Reports previously made that in Germany the deaf were successfully taught to speak and to read from the lips were confirmed, and attempts were made to introduce oral instruction into American schools. The claims of the friends of speech for the deaf were, naturally enough, unfavorably received at first. It was objected that in many instances sign schools had replaced oral schools after the latter had had years of

trial, that under oral instruction the great mass of the deaf could be but little benefited, that the claims of the friends of the oral system were greatly exaggerated, if not absolutely absurd, and that great harm would result to the deaf of America if the attempts to interfere with methods of instruction which had so long stood the test of time were persisted in. Happily the effort to introduce oral instruction was persisted in; oral schools were established, and in 1870 the Pennsylvania institution at Philadelphia following the example set by Illinois in 1868 and later by New York and Hartford, at the recommendation of a special committee consisting of Mr. F. Mortimer Lewis, Mr. James J. Barclay and Mr. Joshua Foster, appointed by the board to examine and report upon the success that had attended the introduction of oral instruction in the New York, Hartford and Northampton schools, resolved to establish a class in articulation.

To accomplish this, Miss Rebecca Cropper, a most estimable lady, was appointed teacher, and sent to the Institution at Washington Heights, New York, where she received instruction at the hands of Professor Engelsman, a German instructor, engaged at that time in teaching speech and lip-reading in that school.

In the report of 1870 we find the following reference to Miss Cropper's work: "Miss Rebecca Cropper commenced, at the beginning of the term, giving instruction in articulation and lip-reading to those pupils to whom such instruction seemed to promise benefit. The classes are neccssarily small, and from a half to three quarters of an hour is devoted daily to each. She has labored faithfully, and manifest improvement in several cases is visible as the result." The instruction in Miss Cropper's classes was similar to that now carried on in our combined schools, and was confined for the most part to those pupils who had some hearing, and those who had lost their hearing after acquiring some knowledge of spoken language, in other words to the semi-deaf and the semi-mute. This was the first systematic attempt to teach articulation in the Pennsylvania Institution or in the State of Pennsylvania.

The subjects of it, as already stated, were mostly semi-mutes who form no inconsiderable proportion of the deaf of our schools. The friends of articulation would have reason to congratulate themselves for bringing about this reform in the instruction of the deaf if they had done nothing more. It was a step in advance upon the old way of doing nothing to help semi-mutes retain their speech, and led, as the sequel will show, to more important changes.

In the summer of 1875, it was my privilege to witness for the first time, some of the possibilities of oral instruction at the admirable institution for deaf-mutes at Northampton, Mass. My visit to that school convinced me that oral instruction meant something more than the "mere accomplishment" in speech afforded my manual schools. I still recall the surprise and pleasure I experienced during that visit. Recitations in English literature and natural philosophy, conducted orally by the present able principal of the school, particularly impressed me.

On my return to Philadelphia, I strongly urged upon some of the managers of our school, the necessity of providing additional facilities for the instruction of our pupils in articulation and lip-reading, even suggesting at that early day, the formation of separate oral classes.

In the fall of 1876, Mr. Edward B Crane, who had been trained by Prof. A. Graham Bell, the worthy President of this Association, was appointed to take charge of the instruction of another class in articulation. Mr. Crane was a well-trained teacher, and was very successful in developing voice in his pupils.

In addition to his regular class work, Mr. Crane formed a class among the hearing teachers and undertook their instruction in Visible Speech, the principals of which he thoroughly understood. He possessed scientific attainments of a high order. He wrought systematically and placed oral teaching upon the scientific basis, which a few years later led to the establishment of a separate department for pure oral work.

Retiring from the work in 1878, Mr. Crane was succeeded by Miss Emma Garrett, also a pupil of Prof. Bell's, who, in connection with Miss Cropper, continued the system of giving lessons to the pupils who were sent to her for instruction in speech and lip-reading only, their intellectual training being carried on in other ways. The work was conducted in this way until 1881, when an important change was effected.

The members of the board of directors, notably Rev. Dr. McVickar, Rev. Dr. Seiss, Mr. Charles C. Harrison, Mr. William Welsh, Mr. Morton P. Henry, Dr. T. Hewson Bache, Mr. George A. Wood, Mr. S. Weir Lewis, Mr. Joseph M. Wilson, Mr. Emlen Hutchinson, Mr. John T. Morris, and Mr. A. Sidney Biddle, having by repeated visits to the oral schools at Northampton, Boston and New York, become convinced of the necessity of enlarging the sphere of our articulation work, decided to take immediate steps to

effect a change. A day school to be conducted orally in connection with the work of the main institution, was determined upon. Every preparation was made; a class-room was prepared, access to which was to be made independently of the main entrance to the school; a large number of pupils, chiefly residents of the city, were enrolled, and Miss Emma Garrett was appointed to take charge of the work as chief instructor under the principal. Fortunately, however, wiser counsels prevailed, and a separate branch, known as the Oral Branch of the Pennsylvania Institution for the Deaf and Dumb, was established as a day school, at Seventeenth and Chestnut streets, *several squares away.*

The school grew in numbers rapidly, perhaps too rapidly for healthy growth; the accommodations soon proved insufficient, and in 1883, two years after its opening, it was removed to larger and better quarters at Eleventh and Clinton streets, where it now is, Miss Garrett still retaining the supervision under the principal at that time, Mr. Joshua Foster.

In the Fall of the same year, 1883, an oral class was established in the main institution under Miss Fannie Wood with a view to try the experiment of oral teaching in a separate class in a manual school. The pupils of this class were taught orally, but were permitted to mingle freely outside of school hours with manual pupils. A similar class under Miss Richards, now of the Rhode Island School, was formed in 1884.

Thus at this time the work of the Institution was carried on as follows: In manual classes, in articulation classes, and in oral classes in the main school; and in separate oral classes in the oral branch; in all, four distinct forms of instruction.

It will be my purpose to endeavor briefly to trace the results of these experiments in so far as they may affect oral work in the remainder of the time which I have allowed myself in the preparation of this paper.

The work of the Oral Branch was slow in developing. The school had grown rapidly, imperfect methods had been applied and the results were not encouraging to separate oral instruction. For a time in the spring of 1884, the disbandment of the school was seriously entertained, but it was finally determined not to suffer the enterprise to go down without further effort to attain success. Changes were made in the supervision of the school and in its teaching staff; new methods were introduced, system took the place of disorder and hard work the place of vacuous claims. The result was

soon apparent, the experimental stage of the school was safely passed, its final and sure success was no longer to be doubted.

Miss Emma J. Ely, a lady of exceptional ability from Mr. Greenberger's school, had charge of the department during this period of transformation. She wrought safely and well and placed the work of the school upon an enduring basis of prosperity.

In 1885, additional accommodations were provided, and the school which had hitherto received day-pupils only, now became a boarding-school, reserving to itself the right to take day scholars as circumstances might make it desirable.

The change from a day to a boarding school was effected with but little friction. Parents of children for the most part were glad to have them comfortably provided for at the school, thus avoiding the dangers of travel to and from home. The teachers were glad to have the pupils more constantly under their care, and the pupils themselves seemed, except in a few instances, greatly to enjoy the change. The experience gained greatly confirms me in the belief that boarding schools possess decided advantages over day schools.

Miss Ely continued in charge of the oral branch till 1887 when, on account of ill health, she resigned her position, and was succeeded by Miss Florence C. McDowell, who had for some time been filling the position of special teacher of articulation with much ability. Miss McDowell continues to devote herself with energy and zeal to the supervision of the school. Examples of her methods in the person of two of her pupils are present at this meeting and speak for themselves of her success.

The department now numbers one hundred pupils, as many as can be comfortably provided for, with ten teachers, and all necessary household and domestic officers; and it is confidently believed that the results attained will compare not unfavorably with those of similar schools of the country.

Meanwhile, the oral classes of the main school, one taught by Miss Wood, to whom reference has already been made, and another by Miss Lewis, of the Scranton School, appointed in 1889, have been carried on with good results. These classes contain twenty pupils, and were originally organized with a view to ascertain whether oral classes could be successfully conducted in connection with manual work. Signs and spelling on the fingers are not used for purposes of instruction—the oral method is strictly adhered to.

The progress of the pupils constituting these two classes has fully demonstrated the possibility and practicability of maintaining

oral classes in manual schools. Their proficiency in the various branches of study pursued is good, their ability to speak and read the lips is, all things considered, fairly satisfactory.

The articulation classes in the manual department, the pupils of which received instruction in speech and speech-reading only, for half an hour or an hour each day, were discontinued in 1888, the work of the oral classes being felt to be so much superior that it was thought wiser to confine all articulation work to classes so organized.

The causes that led to this important change are too numerous to be mentioned here; some of them will be found set forth in a paper upon the True Combined System, which I had the honor to read at the Eleventh Convention of American Instructors of the Deaf, held at Berkeley, Cal., in the summer of 1886.

The work of the school as a whole, is therefore now carried on under two systems, the oral and the manual. Of the 430 pupils that were in attendance last year, 120, nearly 30 per cent., were instructed orally, the remainder by manual methods. Doubtless there are many now under manual instruction who should be taught orally, but our present accommodations will not permit it. With the new buildings in course of erection at Mount Airy completed, the oral department will be greatly enlarged, and all pupils who may be benefited by oral instruction will be offered an opportunity to reap the advantages of such training.

The way has been long, at times dark and dreary enough, but the experience gained more than compensates for the years of trial. We have learned that oral work contains in itself all that is highest and best of deaf-mute instruction, that its possibilities are limited only by time and labor, that it should be freely offered to every child deprived of its hearing.

The time for doubt is gone and gone forever. Speech, God-given speech is the heritage of every child, and every child should be afforded the opportunity, the very best opportunity, to acquire it. Teaching it under the combined system is a good way if no other can be provided; teaching it and by it, in separate classes under the same conditions, is a better way; but teaching it in separate schools where all the conditions are most favorable is in my judgment the best way.

I would not for one moment be understood as speaking disparagingly of the articulation work of combined schools, nor of the articulation work of oral classes, in combined schools, for I know

that much good is accomplished under such conditions, but experience and observation convince me that the best results can not be attained by such training.

The average deaf child cannot be expected to accomplish much in the way of speech and speech-reading with but half an hour, or an hour's training per day, it is simply an impossibility. Even if correct positions be acquired and voice developed, the practice is so very limited and the temptations to communicate by signs or by spelling, so very great that little satisfactory progress can be made. The same objection, in less degree, however, holds good in the case of oral instruction in separate classes in a manual school. There should be complete separation, there should be constant practice, not only for an hour or for five hours per day, but all the time. The general, the constant form of communication must be by speech, the exceptional and unusual by gesture or by spelling. Speech must be taught by speech. There is no other way under the sun by which a deaf child can acquire an easy and reliable command of its vocal powers, there is no other way to make "the deaf to hear and the dumb to speak."

From the experience gained during the past few years, I feel that in concluding, I may truly say that the day is not far distant when the oral department of the Philadelphia school will contain as many pupils, if not more, as the manual department. The numbers in the one or the other will depend upon the condition and capacity of the pupil; the system applied will be suited to the child, not the child to the system. The time has come when all friends of the deaf should stand ready to concede that whenever a deaf child may be successly taught to speak, its instruction should be carried on by oral methods, and by oral methods alone, and that only, when after patient and fair trial, it is discovered that this cannot be satisfactorily accomplished, should its education be attempted by other means.

If there are any questions to be asked in regard to our experience in the Philadelphia institution I shall be pleased to answer them.

MISS YALE: I don't think there is any necessity for questions. Mr. Crouter's paper has been so lucid that we have been able to understand all he said.

THE PRESIDENT: I think that the experiment that has been conducted in the Philadelphia institution for many years past is of the very greatest importance, and I think we should cross-question Mr. Crouter about it. Mr. Crouter has in the manual department of the

school two pure oral classes. The education is conducted by oral methods, but the children intermingle after school hours with the children who know signs and the manual alphabet. And again he has a pure oral department from which signs and the manual alphabet are rigorously excluded, and the children don't have any communication with the children manually taught. I think it would be of very great interest to have questions as to the relative condition of the pupils educated in these two different methods.

DR. WILLIAMS: I would like to have a point explained. I understand that in the oral department occasionally pupils, after considerable trial, are found to make so little progress or such slow progress that they are transferred to other departments. Now, my question is in regard to these pupils, if, after they have been transferred and made considerable progress in the other department, a second trial is made with the same pupils?

MR. CROUTER: It is not done.

DR. WILLIAMS: Could it be done?

MR. CROUTER: It is possible it might be done. A child was removed to our Manual Department during the past year, whose oral instruction began at the Glasgow school when she was very young, a little girl. When she came to Philadelphia she entered our Oral Department. The results in her case were not satisfactory; it amounted to little more than good gabble. We transferred her to the Manual Department, and her mind has been developed and is developing very rapidly. It has occurred to me that possibly in her case removal to the Oral Department, or instruction in one of the oral classes in the Manual Department might be attended with satisfactory results.

DR. WILLIAMS: If there should be many such pupils would you not need a third department separate from the others?

MR. CROUTER: No, if there should be many such I should simply form another oral class in the Manual Department.

DR. GILLETT: Please state why you don't confine your instruction entirely to the oral system?

MR. CROUTER: I have stated in my paper that we should teach a good many more pupils by the oral system when we get into our new quarters than we do now. The fact is I should favor very much having every child upon its reception in the school taught by the oral method, and upon failure to accomplish satisfactory results by such instruction, I would then place them under manual instruction.

DR. G. O. FAY: Is the colloquial language of the pupils in your Oral Department entirely oral, and if so, is it voluntary?

MR. CROUTER: I can't say it is always oral. I know on the contrary it is not. I think where three or four children are gathered together they will use signs to some extent.

DR. G. O. FAY: Is colloquial use of the sign language pro hibited?

MR. CROUTER: Discouraged in every way.

DR. G. O. FAY: Not prohibited?

MR. CROUTER: No, sir; no use in attempting to prohibit it?

DR. WILLIAMS: I would like to ask what proportion of the pupils that you have tried in your Oral Department have had to be transferred afterwards to the other department?

MR. CROUTER: The percentage has been small, quite small.

DR. WILLIAMS: Well, after they have gone back to the other department, what did you find in relation to their progress there?

MR. CROUTER: That is an important question and I want to be very careful in answering Dr. Williams. I think I am within the bounds of strict truth when I say that in the majority of these cases we have not been able to obtain very great results. In other words, we have found that where there has been a difficulty, if not an impossibility, of instructing them in the Oral Department we have not been able to do very much more for them in the Sign Department.

DR. GILLETT: I would like to ask upon what principle Prof. Crouter places certain pupils in one department and some in the other; before he has tried them in either?

MR. CROUTER: Well, if the child comes to school with speech it does not require very much consideration to determine where we ought to place him. We place him at once in the Oral Department. If the child was born deaf and has had educational advantages at home and is of suitable age, we place that child also in the Oral Department. If the child comes to us with a trace of hearing we place him also in the Oral Department. Now the balance we have to place in the Sign Department. For the present we simply make the best selections we are able to make for Oral Instruction.

DR. GILLETT: Then in selecting you give the Oral Department the advantage over the other?

MR. CROUTER: Yes, so far as material is concerned; but I would not wish you to understand from that, that all the pupils who are placed in the Manual Department are of inferior mental capacity. I think the pupils the past year who were admitted to the Manual

Department possessed as great natural powers as the children placed in the Oral Department.

MR. GROESBECK: Mr. Crouter said that children who do not succeed in the Oral Department are turned over to the other department of the school. I want to ask if I am right in thinking that the defect is in the child and not in the oral system?

Mr. CROUTER: I think that is the inference anybody would draw.

PROF. GORDON: If I understand the situation of affairs in your institution you have in the Manual Department large numbers of pupils not learning to speak, not because they cannot learn, but because the conditions of the institution hitherto have been such that you could not accomplish what you desired.

MR. CROUTER: We have not been able to attempt all we would wish in that direction.

PROF. GORDON: Take, then, the case of these two girls in the college who graduated from your school. The reason they have not learned to speak is, not because you thought they could not learn, but because it was impractical to make your arrangements conform to that result; and you expect to extend your facilities so that all such cases will be provided for—at least given a fair trial.

MR. CROUTER: We desire to extend our facilities so that every child shall have an opportunity at least to profit by oral instruction. There shall be a good, honest, fair trial made. That being done, if the results are not satisfactory, we shall transfer them to the other department for further trial by manual means.

MR. LYON: I don't quite understand, since your experience has been such as to tend to show that the scholars transferred from the oral to the sign department did not result in any better mental development.

MR. CROUTER: I did not say that was so in all cases. I do not wish to be understood as making that statement.

MR. LYON: Then as a last resort you would use signs.

MR. CROUTER: I would, unquestionably, simply for this reason: that after a child has been in the Manual Department for two or three years it becomes very proficient in the use of signs and spelling, and to put that child into the Oral Department would be putting an element there which I should regret to introduce. I would make provision for that child in the Manual Department.

THE PRESIDENT: Then if you had the conditions favorable and the space you would put every child into the Oral Department to

start with, and then select from these, those who did not succeed by the oral system, for instruction in the Manual Department?

MR. GROUTER: The purpose will be to introduce every child to instruction *through* the Oral Department. I might qualify this statement to this extent: if a born deaf child should come at the age of fifteen, I do not think we should spend any time upon him in the Oral Department.

DR. GILLETT: Why not?

MR. CROUTER: Because he is too old to begin such work.

MR. BOOTH: I think Mr. Lyon's question showed possibly a misunderstanding of your meaning, in the case of those transfers from the Oral to the Sign Department. His question showed that he thought they might just as well stay in the Oral Department. Will you explain why this is not so?

MR. CROUTER: Because I think the probability of accomplishing something would be decidedly in favor of the Manual System.

DR. GILLETT: You think their mental development would more likely be attained there?

MR. CROUTER: Yes, sir.

THE PRESIDENT: The next paper will be by Miss Rebecca E. Sparrow, of the Clarke Institution.

METHOD OF ARTICULATION TEACHING IN THE CLARKE INSTITUTION.

WEDNESDAY, JULY 8, 1891.—10 A. M.

(LATER WORK).

You have already listened to a paper presented by the Principal of the Clarke Institution, covering the work of that school in articulation and lip-reading, during the first year. The following notes give exercises in special drill work in articulation during the succeeding years.

The greater part of our work being done through speech, it is somewhat difficult to think of this subject as distinct from the work in language, geography, history, etc. We do, however, have in every grade two half hours, usually in different parts of the day, in which we do what we term special drill work in articulation; and these notes are intended to give an idea of ways of working in the different grades during this time.

One of these half hours is, as a rule, devoted to the correction of defective sounds, breathing exercises, vocal gymnastics, or direct work on voices, whichever seems best at the time, for the class as a whole. The other half hour is usually given to drill in accent, emphasis, clausing, etc., as applied to connected language.

With few exceptions, the little ones go home at the close of the first school year with the ability to pronounce fairly well the elementary sounds, alone and in combination; but with the long vacation of three months, it is not to be wondered at, that at the opening of the new term in the fall, the teacher finds that some of the sounds, apparently so firmly fixed, have partially or even wholly slipped away and must be regained; this is done, however, with comparatively little expense of time and labor, owing to the growth

of the child's mind, and also to the increased strength of the vocal organs and to his greater control over them, gained by the previous year's training.

We expect, with the younger grades, some loss in distinctness of articulation during the vacation, but this loss lessens with each succeeding year; and we sometimes have the encouragement of finding that there has been gain, instead of loss, in the time spent at home. On the pupil's return to school, review of the elements, combinations, etc., is at once begun; and all defects, whether of pronunciation or of voice, are carefully noted before the ear of the teacher has become accustomed to the child's speech, and, by familiarity, has been rendered less critical as to defective sounds, and less sensitive to disagreeable voices. This testing of the child's speech in various ways, is done in every class during the first few days of each new term. The reading of familiar rhymes has proved a very useful exercise for this purpose. The ear, so accustomed to the correct pronunciation, detects the slightest variation from it, as one detects a false note in a familiar strain of music. Other tests often made use of in this work are: reading connected language adapted to the pupil's comprehension, but wholly unfamiliar to the teacher, and reading lists of words, so that the teacher may not have the help of context to furnish a clue to understanding. In these exercises watching the pupil's lips is to be avoided, for we are all lip-readers in a greater or less degree; and there is great danger that we depend upon sight instead of sound. This critical examination of the speech of the pupils at the opening of each new term, seems especially important. The keeping of a careful record of such examinations for reference and as a basis for the term's work, is also of great importance. Tests are given at intervals throughout the year, and each may be made a source of encouragement to the pupils by noting any improvement since the previous one.

Herr Vatter says: "*Teachers of the deaf should hear and see more than they do.* Our present teachers of the deaf all hear; they hear themselves speak; they hear how those surrounding them articulate; they hear, besides, the speaking of their deaf-mutes; or—do they not hear them? We might almost feel inclined to say they do not always hear the speech of their pupils, else they would try to cultivate it more after the model of the speech of the hearing world. The daily listening to the speech of the deaf-mutes has, unfortunately, a highly detrimental influence on the critical hearing of the teachers. *And this it is which, in my opinion, is the worst enemy to better*

speaking in our institutions for the deaf. The teachers must therefore constantly test his hearing, and not allow his ear to get accustomed to the defective articulation of his pupils; in fact, his own hearing must supply the want of hearing in his pupils."

In this and other articulation work, we often avail ourselves of the help of our neighbors' ears, knowing that our own are not always trustworthy. A writer in the Deaf-Mute *Quarterly* has said: "The master ought to mistrust his own ears. Call to your aid all the ears you can. I would even say: all the ears in a well-governed institution should be put under contribution."

The defects noted in these tests, and others which may become apparent during other exercises, are suggestions for work in the articulation drill time mentioned.

In all classes there are found errors common to several of the pupils. These furnish material for class work. We prefer to do as little individual work as possible during this articulation drill time, even with the very youngest pupils, feeling that the class stimulus and the concentration of attention and energy of all upon a single point, are of the greatest value. It is true that articulation work must be, to a certain extent, individual work, but the effort is to make it so just as little as possible.

These charts* have recently been arranged, and thus far have proved very helpful in the work on elements and combinations. They contain only the most commonly recurring difficulties, such as require frequent drill to keep perfect, not making, by any means, a scientifically arranged set of charts. They consist of short lists of words under each troublesome element or combination.

Words have been preferred to meaningless combinations, one reason being that the teacher will most readily detect slight inaccuracies of pronunciation in combinations, which are familiar to her as words. As far as possible, words familiar to the majority of the pupils have been used. This accurate and persistent drill given to words belonging to the child's own vocabulary will give him these as key words by which to pronounce others of similar construction.

In order to present the fewest possible difficulties in one exercise, monosyllables have been used on all the charts except one, where the combination is such as not to admit of it.

No word appears here which cannot be pronounced correctly, without help, if the child has fully learned the different spellings for

* Referring to a set of charts used at the time for illustration.

each sound, as given on the elementary charts which have been explained by Miss Yale. Sounds which are numbered upon the elementary charts are numbered here.

In arranging these lists, the aim has been to contrast, as far as possible, such elements and combinations as are often confused in the child's speech; as *t, d, p, b.* In this way the points of difference are emphasized. This is done by taking, as opposites, words differing only in the one point to be contrasted; as, *bet, bed; back, bag.* Wherever a connection between two columns is indicated, it is to show that they are to be contrasted.

On Chart I. we have the non-vocal consonants *p, t, k, ch,* and *wh,* contrasted with their corresponding vocals *b, d, g* (hard), *g* (soft), and *w.* Words beginning with *h,* which is, in fact, only the whispered form of the vowel following it, (and which is so often conspicuous by its absence) are contrasted with those beginning with the same vowel formation; as *harm, arm.*

On Chart II. certain vowel sounds are contrasted,—ō with *ou;* ä with ó; ā with ī; ă with ŭ; ē with ĭ; ĕ with ă; the last four being arranged for continuous contrast if desired.

On Charts III, and IV. we have combinations of *l* and *r* with other consonants. These two charts give opportunity for work on the non-vocal forms of these elements in combination. The child is taught from the outset that when *l* or *r* follows a voiceless consonant, it is itself voiceless. The same is true of *w,* drill upon which is given on Chart V. together with other combinations.

In all these consonant combinations, pains is taken that the combination of the elements becomes as nearly perfect as possible, the second position being actually taken before the first is relinquished.

On Chart VI. are words ending in *l* and *r,* preceded by a vowel.

Chart VII. is arranged with two objects in view. Besides serving as a drill upon difficult combinations, it teaches the rule that in the suffix *ed* in the past tense of verbs, the *e* is silent; and the *d* is equivalent to *t,* when the root ends in a non-vocal consonant as *whipped, missed*; but when the root ends in a vocal consonant, the *d* retains its vocality, as *rubbed, sinned.* In using this chart, we require lists of all the verbs of the pupil's vocabulary to be written under the proper headings, and drilled upon in pronunciation; then, verbs ending in *ted* and *ded,* in order to teach the exceptions to the rule. Unfamiliar verbs are then written by the teacher, for practice in applying the rules.

We have the charts arranged on the school-room walls in such a way that they may be in sight of each pupil; and whenever, in the regular recitations, as well as in the drill time, mistakes are made, the pupil's attention can readily be turned to the chart, and he be made to run through the brief list containing the element over which he stumbled. While drilling upon these charts, sentences are constantly used in which the same words are incorporated; as, A big duck stood at the edge of the ditch; A large boy climbed a larch tree. The following exercise never fails to secure the attention of the entire class and their most careful pronunciation. The teacher hastily jots down on the wall-slate a list of combinations; as, *wheep, weep, whip, wip;* or, *bean, bin, ben, ban; pean, pin, pen, pan;* and after she has tried the pronunciation around the class, the pupil who has been most careful to make the distinction clear is allowed to point for the class to pronounce in turn, changing the order as he likes, while the teacher, seeing neither the child's lips nor the combination pointed at, writes on the opposite slate what she hears, which will not always be what the child thinks he is saying. Each one is eager to make the teacher understand, and anxious to have note made of the fact, if he has been able to go through the entire list making clear each desired distinction.

In some of the younger classes, every correction of speech is noted by the teacher, and when articulation time arrives, these words collected through the day are written on the wall-slate, and the entire class begin work upon them. As a rule, no word is erased until each member of the class has learned to speak it correctly. The class feeling, thus aroused, urges on the laggards to do their very best. Those who complete their work first are allowed to make lists of similar words and practice them; thus no time is wasted. When the child is perfectly sure that some note, either mental or otherwise, is to be made of his errors, and that there will be no failure in calling him to account, he is far more painstaking than he otherwise would be, and he has a better opinion of his teacher, which is no small gain; but the effectiveness of this practice lies in its *invariableness.*

A list, for each child, of the principal elements needing work is by some teachers kept upon the wall-slate, and as soon as the correct pronunciation of one of these sounds has been obtained and *has become a habit,* that sound is erased, but not until then. By this means, the children are incited to use more care throughout the day in the regular recitations.

Some teachers keep, also, a list of errors made through carelessness; not erasing any sound until two or three days have passed without the child's having once made the same mistake. The children themselves are often required to note, in books of their own, careless mistakes made in any recitation, and to report the number and kind at the close of each day.

We do not think it wise or right to take time for drill upon sounds which we are sure have been mispronounced through carelessness; but even the youngest child is held responsible for any sound or combination which he has the ability to give correctly; for there seems to be no more reason for allowing carelessness in pronunciation to pass, than carelessness in spelling or language, although allowance should be made for sounds not already fully acquired.

Diagrams of this kind * help to give a desirable variety to the work on elements. By means of these any incorrect position taken can readily be shown, and beside it, the correct one for comparison. For instance, if a child forms *k* with the back of the tongue applied too far forward, draw the tongue in that position to show him what he is doing, and then draw another diagram with the tongue in the correct position; or correct the first by a dotted line or colored crayon. Reading from diagrams is just one more way of keeping in mind the correct positions for the different sounds. We have long been accustomed to write words in diagrams drawn upon the wall-slate. We now have diagram cards † which save time as they can easily and quickly be arranged in words.

We mean to keep well ahead in the pronunciation of words which are soon to occur in new lessons, especially in the younger classes, not allowing the pupils in these classes to study anything in which the pronunciation of the new words has not been learned. Otherwise the wrong pronunciation is almost sure to become so firmly fixed as to always prove a stumbling block. We sometimes take up these words in the articulation time, and sometimes in the time assigned to the lesson to which they belong.

Taking long geographical names and technical terms from the lips is not insisted upon; but such words are usually written upon the wall-slate, and the pupil is required to pronounce them independently just so far as possible. When a word is neither spelled

* Diagrams representing the vocal organs in position for the elements of speech, were drawn upon the blackboard.

†For these cards, diagrams in one of Prof. A. Melville Bell's works were taken as the basis. These were enlarged and somewhat changed otherwise.

phonetically nor pronounced according to any rule known to the pupil, the pronunciation is shown by means of the spellings on the elementary charts, except in the older classes, where the pupils obtain it directly from the dictionary. This affords an opportunity for practice in pronouncing new words without the aid of the teacher's lips, and such practice seems to be necessary in the pupil's training, in order than he may gain a certain amount of confidence in his own ability to pronounce unfamiliar words as he finds them in his general use of books. Words are marked for pronunciation thus,—(D)neiper, though, through, champa(g)ne. It is not often necessary
(ee) (o——e) (óo) (sh)
for the teacher to divide words into syllables when marking them for the pupil to pronounce, as he is taught to do that for himself, according to the following rules:

1. Every syllable must contain at least one vowel sound (or one liquid sound).
2. As far as possible, each syllable should begin with a consonant.
3. Double consonants are treated as one; as, si–tting, wi–lling.
4. Two unlike consonants are separated; as, sil–ver, win–ter.
5. In some words *r*, and in others *ng*, is forced to do double duty, having one sound at the end of one syllable and another sound at the beginning of the next; as, inte*r*esting, and you*ng*er. In dividing such words into syllables, this may be indicated in either of the two following ways: fear–ing or fear(r)ing; fing–er or fing(g)er.

When a word is mispronounced, often the surest and, in the end, the quickest way of correcting it is to write it phonetically just as the child pronounces it. For instance, if a pupil says *dud* for *did*, *ome* for *home*, or *shicken* for *chicken*, it is so written; this places his mistake before his mind in the most graphic manner, making him do his very best to correct it at once, and leaving a much more lasting impression than would be made by an oral correction.

The gymnastics of the vocal organs, used during the first year, are continued throughout the course, and others introduced; the tongue gymnastics being continued in all cases of partial paralysis or slight stiffness of the tongue.

Disagreeable voices are helped by gaining control of the parts wrongly used. For this purpose various gymnastics of the soft palate, of its pillars, and of the pharynx are used. These have been

collected for our use from various sources. The following are the principal ones:

GYMNASTICS OF THE SOFT PALATE.

1. Breathe through the mouth with the mouth wide open. The soft palate will be slightly raised.

2. Inhale through the nose with the mouth open, making every effort to keep the tongue still and flat, especially at the back. This will bring the soft palate down vigorously. Then exhale through the mouth and the soft palate will rise. (Two tiny strips of tissue paper, one held at the nostrils and one at the mouth, aid in determining whether the directions in regard to breathing are being followed.)

3. Practice raising and lowering the soft palate at will and holding it still at its highest point.

4. With the soft palate held steadily up, breathe out softly and follow breath with voice as a part of the same stream.

GYMNASTICS OF THE PILLARS OF THE SOFT PALATE.

1. Draw the pillars together until they touch if possible.

2. Separate the pillars as far as possible while the soft palate is held up.

3. Keeping the pillars wide apart, breathe; add voice; repeat familiar, short sentences; talk.

GYMNASTICS OF THE PHARYNX.

1. Contract and relax the muscles.

2. Think a gape and sound *aw*. (This is an exercise for opening the pharynx and gives what Monroe calls a pear-shaped cavity.)

For the correction of nasality, in addition to the gymnastics of the soft palate, we use an exercise based on the breath-consonants *f*, *th*, *s*, and *sh*, practicing them with the greatest possible force. This attempt to direct all the breath through the mouth forces up the soft palate. We then practice the same consonants with the open vowel *ă;* as *fă*, *thă*, *făf*, *săth*, in the same forcible manner. In Mr. Kinsey's book may be found a useful list of combinations arranged with special reference to overcoming nasality, We give, also, sentences arranged on the same principle, that is, containing no nasal element.

The principal thing done to lower the pitch of the voice is to direct the pupil's attention to the vibrations in the teacher's throat

and chest, and to contrast these with those produced by his own tone as imitated by the teacher.

We are cautioned never to continue any of these exercises long enough to be fatiguing, but to practice such as are necessary, regularly and vigorously every day, for otherwise they are of little value.

In all these articulation exercises, the hand-glass and manipulator are in constant use, and the sense of touch is utilized to its fullest extent.

During the past year our pupils have had gymnasium work for half an hour on alternate days. We think that already the good result of this has been shown, in some instances, in increased strength of voice and power of sustaining tone; and we anticipate more help in the future in our articulation work, through these exercises, several of which are directly calculated to strengthen the muscles of respiration and to keep the chest expanded and rigid. As accent affects the intelligibility of speech to such an extent, we consider drill upon this point of the greatest value in our work. In a word given with correct accent defective elements often pass unnoticed. Let a word be pronounced with precision in regard to the formation of each element, and the elements well combined, but with the accent upon the wrong syllable, and then let the same word be pronounced with defective elements or combinations, yet with the accent correctly given, and the latter pronunciation will, in the majority of cases, be the better understood. We have noticed, again and again, when a child has tried to pronounce aloud new words found in his own reading, that these words are often unintelligible for no other reason than the misplacing of the accents; as, contrition for contrition, bellowed for bellowed. We consider that the teaching of a word is not complete until it can be given with correct accent, as well as correct elements and smoothness of combination. In doing this the obscure vowels must of necessity be taught. One teacher says that no other thing which she has attempted in the line of articulation drill has done so much for the general improvement of the speech, as the work on accent.

In teaching this subject we have to remember that the accent falls upon the vowel in the syllable if that vowel is long, but if short, upon the final consonant in the syllable. In the first case we usually teach the accent by a still further lengthening of the vowel; in the second, by lengthening the consonant. Some teachers prefer the method of giving the syllable more forcibly. In marking words for pronunciation, the accent is sometimes indicated by drawing a

heavy line under the syllable, sometimes by writing it in a coarser hand, which perhaps, appeals most strongly to the eye, and often by using the mark of accent from the outset. Even though attention has been paid to the accent of each word from the first, frequent reviews seem to be necessary, and the drill on long lists arranged according to the syllable accented, is very helpful. After the child has gained the ability to accent words by following the movement of the teacher's hand, by the tap upon the shoulder, etc., he learns to determine by watching the teacher's lips alone, which syllable is accented. In all the other classes the direction to accent a certain syllable is given in spoken language, as are all directions for the correction of articulation, as early as may be. When the dictionary can be used, the new words which are to occur in other lessons are given to the class, in writing, to be looked up and the accent and pronunciation ascertained.

Emphasis depends so largely upon the reasoning powers that it is much more difficult to teach than accent, which is a mere matter of memory. The amount of time spent upon emphasis varies with the class, as the teacher must decide whether, judging from the mental ability of the pupils and their needs, the results attained would be likely to justify the amount of time and labor, which must necessarily be expended to gain the power of fairly good emphasis. Drill on simple poems suited to the child's comprehension, and of such a nature as to excite a lively interest, has proved of considerable value in this work, and is one of the best exercises with which to make a beginning. Kindergarten rhymes, in which the action is suited to the word, are good.

But of quite as much importance as all else is the example of the teacher. Natural, earnest speech on her part does not fail to be imitated by the pupil. From an article in the *Annals* giving an account of a visit to Herr Vatter's school at Frankfort-on-the Main, I quote the following: By means of his sonorous articulation and animated delivery, his pupils, without having their attention specially directed to the subject, are made involuntarily to give the right intonation of each word and clause, and to pronounce sentences with uninterrupted respiration. . . . . Mr. Vatter's articulation to his pupils was distinct and natural and with the same force and modulation as if he had had a class of hearing children before him."

Various oral exercises in original language are given during this articulation drill time, such as conversations, picture descriptions,

oral journals, &c., in which the main point in the teacher's mind is allowed to be accurate speech rather than the acquisition of new language.

It is not intended that any errors in speech should pass unnoticed whatever the recitation may be. As Herr Vatter strongly puts it, "*Every teacher must insist at every lesson and at every sentence, nay, at every word, that his pupils speak with the best possible articulation.* The teacher of the deaf cannot be too often nor too strongly reminded of this sentence." Much of this may seem hard drudgery to some, but our experience leads us to believe that articulation drill work, so called, may be made quite as interesting and enjoyable as any other part of the school work.

And may I add in closing, that not the least important factor in the work done in our school is the teaching which the teachers themselves receive from the principal. To her we are indebted for a systematic course of instruction in the studies underlying the teaching of speech and speech-reading to the deaf, and also for the opportunity of pursuing under her judicious guidance a course of reading in the history and other literature connected with the profession.

During the reading of her paper Miss Sparrow illustrated her method by means of two pupils from the Clarke Institution, Melvin and Homer Wheeler.

THE PRESIDENT: May I ask at what age these boys became deaf?

MISS SPARROW: Both were born deaf.

MR. GROESBECK: I would like to ask Dr. Bell how Miss Sparrow's diagrams differ from visible speech?

THE PRESIDENT: Our characters are symbols. These are preferable, I think, where they can be employed. The principle is the same.

DR. FAY: Is this any plainer to deaf children than symbols?

THE PRESIDENT: Much plainer; of course, drawings are much more expressive than symbols can ever be, but they are not so readily made.

MISS HAMILTON: Should you consider the symbols of any value to a child if they did not recall these positions?

THE PRESIDENT: Of course, but not of so much value.

DR. GILLETT: I would like to state that if we had nothing else than this description of the Methods of the Clarke Institution we have value received for all the trouble of coming to this Convention.

PROF. GORDON: I attach the greatest importance to the use of these diagrams, and I take this opportunity to say that Mrs. Keeler of the New Jersey Institution has had a plate prepared to slip into the roof of the mouth and by giving it a coating of chalk dissolved in alcohol the tongue is made to record its different contacts. I believe she has considered that a very great help in illustrating positions to pupils.

NOTE:—For illustrations of this valuable method of obtaining a clear idea of the tongue's positions, see Kingsley's *Oral Deformities*, or Gougillot's *Comment on fait parler les Sourds-Muets.*—J. C. G.

THE PRESIDENT: I would like to make a remark. I have been very much struck by the use of these diagrams and I have been struck by the use of the face diagram, which is a permanent thing, and the ability to change the position by chalk and rubbing it out; and I will suggest that it would be a very valuable thing to have a blackboard of standard positions, and when the child makes a defective sound to put in crayon the position of the tongue that he assumed in uttering the incorrect position. Then you get the same thing as with visible speech. You get a comparison between the position that should be assumed and the position that was assumed of such a character as to direct the pupil.

MR. GROESBECK. Is there any danger of a mechanical result from having so much position? Is there any tendency of that kind to be guarded against?

THE PRESIDENT: I think, Mr. Groesbeck, that in curing defective sounds, all teachers will admit that it is very necessary, or at least, advisable, that we should describe to the pupil what position his vocal organs assume when he is making a sound, and contrast that with the position he intended to assume; and thus the pupil gets the knowledge of what to do to correct sound. That is just the advantage of the use of visible speech; in representing the defective sounds in such a way that having a model in mind the pupil gets the instruction we want to give him, and in a very graphic way. You might even have a series of heads made in which the result would be still more graphic.

[Dr. Bell then delivered his lecture on "Consonants." A report of this lecture will be found in the proceedings of Friday, July 10.]

(*Adjourned to 2:30 p. m.*)

WEDNESDAY, JULY 8, 1891.—2:30 P. M.

DR. WILLIAMS: I have been requested to set before you the theory and the practice of the American Asylum regarding the teaching of speech and speech-reading.

This is an age of experiment and improvement, and at Hartford we have experimented as thoroughly and advanced as rapidly as any all along the line.

Experience and observation have led us to believe that every deaf child entering school should have an opportunity to acquire speech and speech-reading.

We believe that, other things being equal, *i. e.*, the same general mental development being secured, any child is better prepared to go out and take his place in the world, if he has the power to speak intelligibly and read the lips easily, than he would be without that power.

We believe that the learning of speech and speech-reading, in all cases where a useful degree of success can be reached, is a very important part of the child's education.

This is our creed and we live up to it. Every child entering our school is given a thorough and protracted trial under skilled and experienced teachers of articulation and lip-reading, and no child is dropped from those branches until those teachers recommend it, and not always even then. I have not with me figures to give the exact percentage of those retained, but I should say that of those received into our school in the last five years, 75 per cent. or 80 per cent. have continued their instruction in articulation and lip-reading, and if anybody can convince me that the other 20 per cent. or 25 per cent. can get enough of speech and lip-reading to be of any practical benefit to them, they shall be taught, too.

If I believed, as Mr. Crouter said this morning that he believes, viz.: that all children could get as much of general development through the oral method as through any other method, I certainly should consider, if I stood in his shoes, that I was doing great injustice to the 70 per cent. of pupils in the school over which he presides to whom no opportunity of acquiring those branches was afforded. Parents could justly complain that their children had not a fair chance as compared with others. At Hartford we not only give every pupil an opportunity to learn speech and lip-reading, but also restore to the oral department any who have lapsed from it, if in their subsequent development we discover encouraging signs of possible success.

Now as to our method of work in this department.

We have not come here prepared for any formal exposition of those. We have brought no charts or diagrams; have prepared no papers to be read. We came not to teach but to learn, and we have been well repaid for coming. I am very sorry, however, that we have none of our pupils here to show you the results of our work, for I am sure that they would convince you, as no words of mine can, of the genuine and very successful work we are accomplishing in the teaching of speech and speech-reading.

Our pupils spend one hour a day in oral work. It is as much a branch of study as Arithmetic or History. The hour is divided into two parts. In the one-half hour the emphasis is placed on lip-reading, and in the other half hour the emphasis is placed on articulation, though both lip-reading and articulation are used in each half hour.

The object of this division of the hour is to secure better classification with as little interference as possible with the other departments of the school. We all know that better work can be accomplished with proper grading. We all know too that some pupils make more rapid progress in speech than in lip-reading, while others advance faster in lip-reading than in speech. The same pupils will not always be graded together in both branches. Again, pupils from the same manual class will not always grade together in oral work. To secure as little interference as possible between the two departments of the school—the oral and the manual—the lip-reading classes are in session for an hour before the general opening of the school i. e., from 8 to 9 o'clock. The pupils in any one class in lip-reading may come from three or four or more classes of the manual department, but the time is taken from the industrial department and not from class work. There are four teachers of lip-reading, enabling us to have eight classes of a half hour each, within the hour devoted to that exercise. Three of these teachers devote all their time for the rest of the day to the teaching of speech. This enables us to take all the articulators from a manual class at the same time, to secure proper grading without interrupting the work of the manual class for more than one half hour during the day, and to secure very small classes with which to work, so allowing more individual instruction and making possible better results. Our teachers in the Oral Department are thoroughly trained and experienced in the teaching of speech. We make use of the same principles and of many of the same charts and devices that have

been exhibited on this platform, and it is not worth while for us to take up your time in going over ground which has already been covered. In our oral work we never hesitate to use the manual alphabet, or a sign, where such use will enable a pupil better and quicker to secure a clear apprehension of difficulties and accurate execution in overcoming them.

Miss Fay, one of our teachers in the Oral Department, is here and will answer any question you may wish to ask as to means and devices used in her work.

DR. GILLETT: Mr. Chairman, I know the time is exceedingly limited and I promise not to occupy much of it. Some of you know that I am one of the original articulation teachers. I was raised by and under the strictest sect of the Pharisees, having been trained by Dr. McIntyre and taught to believe that it was not practicable or sensible to undertake to teach speech to the deaf. I was earnest in the conviction. But I saw in the newspapers in 1867-68 accounts of the work that Miss Rogers was accomplishing at Northampton. When the first Conference of Principals was called to meet in May, 1868, I wrote to Mr. G. O. Fay, Superintendent of the Ohio Institution, Mr. McIntyre of the Indiana Institution, Mr. Kerr of the Missouri Institution, Dr. Milligan of the Wisconsin Institution, and I think also to the elder Mr. Fay of Michigan, suggesting that we all meet in Northampton at a given time, as we might take that place en route to Washington where the Conference was to be held. Our expectation was to see something that was palmed off on the public as genuine, which nobody who had visited that Institution had sufficient discrimination to detect as a fraud. This is an honest confession, but I hope I shall feel better for it.

I went first to Boston and saw Mr. Hubbard, and also saw Miss May Hubbard, now the wife of our honored President. Mr. Hubbard took me into his house, where I had an interview with Miss Hubbard, whom I was desirous of seeing, as I had heard interesting particulars of her case. My peace of mind was much shaken by this interview. I then went down to Northampton, Mr. Hubbard going with me. I spent two days in Northampton, Miss Rogers giving me every opportunity of learning all I wanted to know. Dr. Milligan was with me; the other gentlemen had not quite courage enough to come to time. We had a most delightful and instructive visit. It was one of the important milestones in my life. Before I left Northampton I was entirely changed in my opinion as to the advisability of attempting to teach the deaf to speak.

Dr. Milligan and I proceeded to Washington and at the Conference gave an account of what we had seen at Northampton. If you will take up the proceedings of the First Conference of Principals, known as the Sixth Convention, May 17, 1868, you will find something in that report from Dr. Milligan and myself. I felt it was time to right ourselves and I thought that the occasion had arrived for the institution with which I was connected to take into consideration this new method. After reaching home I made a special report to our trustees concerning the subject, and received from them authority to immediately begin classes in articulation. We made honest work in that direction and have carried it on conscientiously. Not to the degree of efficiency I would like to have done,—but still we have accomplished something for which we are very thankful.

Now there is nothing small about me. I am ready to take in all methods of instruction and I want all good methods; the symbols of Prof. Bell and Miss Yale, and indeed all of merit that everybody else has. I am very much like the old-time Democrat whose loyalty was called in question. It was said he was opposed to war. He said, "I am not opposed to war." "Well you are not in favor of carrying it on." "I am not against carrying it on, I am in favor of this war and the next war; I am for war, famine and pestilence." In articulation teaching we have not overcome all difficulties and cannot by any one method. I believe every one has its excellencies and no one method has all the excellencies to the exclusion of others. I think it is wise to be eclectic as far as possible.

I began immediately upon my return from the Principals' Conference in 1868, two classes in articulation. They were to be taught articulation and to be taught by articulation, which we did for some time; and, but for the fact that by that procedure we were building up a complicated organization—an organization within an organization—those classes would probably have been continued to the present day.

Now, in whatever we have succeeded in doing, we have largely profited from and been aided by others. I want just here to pay a tribute of profoundest respect to one of the noblest of women, Miss Cornelia Trask, who, I think, gave herself a martyr to the cause. If any woman did honest sincere work, Miss Trask did. Her's was most efficacious work.

There comes now to my mind an incident of the mother of a deaf child, a most touching and beautiful incident. Her little girl, Nellie, supposed to be feeble in mind, was taken to a school for

the feeble-minded. I was at the time trustee of that institution and transferred her from the institution for the feeble-minded to our institution. I once asked her mother why she took Nellie to the feeble-minded school. She said: "Well, her father did not think she was bright and I thought I never should hear my child's voice if I took her to your institution." We had transferred her to our institution without consulting the parents, and I determined when contemplating the question of articulation that Nellie should be one of the first to have an opportunity of making the attempt. She proved a most excellent case, an earnest, persistent, indomitable student of articulation and lip-reading. She and my daughter were of the same age, and would sit and sew together hour after hour without any use of the sign language at all. She loved to talk and was proud of her faculty of speech, and used it on all occasions when with persons with whom she could speak.

Our plan at present is, and has been for some time, to give an earnest and sincere test to every pupil that comes into the institution, as to their ability to use the time to good advantage in learning lip-reading and articulation. Last year I received fifty-five new pupils, and every one of them were earnestly and persistently practiced in the effort to teach them articulation; and that has been the practice of our institution for years; all have an opportunity and will have an opportunity of showing either that they can or cannot learn speech. We do more than that. We find some pupils who have not the mental development to improve their time to the best advantage. These are laid aside for a time, and an attempt made with them again, and sometimes a third attempt. So that the purpose and practice is to give every one the utmost possible advantage in this direction. Numbers of our pupils succeed. Our articulation department now consists of two hundred pupils and six teachers. The teachers give to some of the articulation classes ordinary school exercises in speech, thus co-operating with and assisting teachers in the sign classes.

Then we have adopted, at the suggestion of Miss Gillett, a plan which we find to be very good, which is to rotate a class from teacher to teacher every day, so that on Monday a class will be taught by Miss Gillett, on the next day by Miss Kent, on the next day by Miss Higgins, and so on; thus every day each class has a different teacher in articulation work. This is done because in some cases we find that a pupil will understand his own teacher, but not another person. By our system of rotation, pupils are constantly becoming accustomed to the use of articulation with different

individuals and to reading the lips of different persons. We have found this method very satisfactory as well as helpful. We have classes in history, who, when they go to the articulation teacher, recite their lessons in history orally; and some in arithmetic, and so each department is really helping the other, and the time spent in articulation classes is not in any way impeding the work in other departments of the school.

I don't think we have arrived at the degree of excellency we hope to attain, but I think we are on the way to it, and will "get there" in time if we keep on and you will all help us in this endeavor. We expect much help from this Convention and its members, whose friendly aid and counsel we will gladly receive.

DR. FAY: I attended the Conference of Principals to which Dr. Gillett has referred as meeting in 1868, and upon my return to Ohio, as soon as it could be brought about, a section of the school, made up of selected pupils, was set off for oral instruction of the purest character; and the Ohio Institution has prosecuted the teaching of speech ever since steadily and by various methods.

DR. WILLIAMS: I would like to say that our experience has been the same as Dr. Gillett's in one point; and that is where a child has been dull at the beginning and made very slight progress, we sometimes have dropped it as a hopeless case apparently; but after a while we have found that the child did wake up to a general development in the school. In such cases we have tried it again, and sometimes with very encouraging success.

PROF. GORDON: You know, I am not personally connected with the Kendall School, but the interest which I have had in speech-teaching has led me to visit that school a great deal. The number of pupils under instruction in articulation last year was thirty-four, out of fifty-eight pupils in all, one teacher devoting her entire time to this work and others rendering incidental aid in their own classes so far as practicable.

The method of instruction I will not attempt to describe. I will simply say that the schoolroom is furnished with the same sets of charts that we have seen here. There are charts with visible speech symbols and some other diagrams that are helpful. These diagrams are considered very useful by the teacher; and in addition she has placed prominently, all around the room, small cards which I think Prof. Bell must have prepared many years ago. They have visible speech symbols, pictures, and the names of objects written in visible speech.

THE PRESIDENT: I think that was Miss Fuller's idea.

MISS FULLER: I believe we arranged them together They were printed in Boston.

PROF. GORDON: The teacher finds these useful also, and she keeps upon a slate, the walls being well provided with slates, exercises which stand sometimes for a week at a time, for drill purposes.

Before I sit down I would like to speak of a few of our students. Mr. Crouter this morning did not seem to think it advisable to begin to teach speech to persons of fifteen years of age or older, and I am sure I don't know what is best in regard to that. This is a point upon which I wish more light. We have in the College a number of students, now young men and women, and it is an important question whether it is best to begin teaching speech to them. I think it is, judging from the experience which Miss Gordon, the teacher of articulation, has had in the Kendall School. She has had a few pupils of this kind. I recall a young lady from the South, born deaf, or deaf very early, who was educated in the South Carolina Institution and prosecuted her studies further in our Institution. I presume she was twenty years of age. At first, she did not wish to learn to speak at all, but one day she concluded she would try, and surprise her parents by being able to say "papa" and "mamma," and asked Miss Gordon to teach her these words; I believe that was the height of her ambition. Miss Gordon took her in charge, and in a short time she not only had her speaking "papa" and "mamma," but a whole column of little words. She ran over her column from day to day making additions to it, and in the course of a few weeks her slate was covered with finely written words and short sentences, every one of which she uttered very intelligibly indeed. After nine weeks' instruction of fifteen minutes a day, she spoke short sentences containing thirty-two different elements, and not long afterwards she surprised her teacher one day by telling her that she had visited a dressmaker, and alluded to her errand entirely by speech.

Then there was another case: a boy who was not considered very apt in his studies. He was probably eighteen years old. I don't remember his previous history. He was not in the Kendall School a great while, but he manifested some curiosity about speech and desired to learn some words. Miss Gordon taught him and he acquired quite a vocabulary and got into the habit of speech; but as he did not get along very well with his studies, he desired to withdraw, and he went to work, I think in Massachusetts, in a cabinet shop. In a short time he wrote to Miss Gordon, saying: "I am

very thankful to you that you helped me to learn speech. I speak often in the work-shop and with my friends. I could not get along well without it. My sister talks with me and tries to teach me." I know a few others nearing adult life who are learning useful speech. The question is a very important one with us and I wish to get all the information I can from others bearing upon this point.

DR. GILLETT: I have been asked the question: "Why didn't you bring some of your pupils with you." In the first place I did not know I could come myself until the day of my departure from home, and in the second place I did not know any pupils would be expected. I am very sorry I did not know in time to bring some with us, for I assure you I would not have hesitated to do so.

MR. WESTERVELT: I have a letter from Dr. Edward Gallaudet, President of the College, which Dr. Bell thought it would be well to read following Prof. Gordon's remarks in relation to articulation work at the Kendall School.

QUIMPI LODGE, Bradford, Conn.

DR. A. GRAHAM BELL, President, Etc. July 2nd, 1891.

My Dear Sir: Many thanks for the telegram received from you to-day.

I regret that my engagements make it impracticable for me to attend the current meeting of your Association, but I am not neglectful of its objects.

As the greater includes the less, and as I am giving my time daily to a work intended to promote the education of the deaf in all its branches, you will see that I am doing my duty as a member of your society, though unable to enjoy the pleasures of Crosbyside.

With greetings and best wishes to the friends who have kindly remembered me through your telegram, I am Very truly yours,

[Signed] E. M. GALLAUDET.

MISS YALE: Miss Barton will show us some work in her school in connection with some of her pupils, whom she has here.

Miss Barton here gave an exhibition with one of her pupils. She then brought on the stage a young man, Joseph King, aged twenty, who read a number of sentences from her lips and indicated an understanding of what she said, but was unable to repeat her words because of his lack of language. He gave the idea in his own language, however, with sufficient clearness to show that he comprehended what she said. Dr. Bell then talked with him, and Miss Barton asked him if he could read the speech of gentlemen who had moustaches. He answered, he could if the moustache was not too large.

PROF. GORDON: When did he come to the school?

MISS BARTON: He entered the school three years ago in the spring of 1888.

PROF. GORDON: How much language had he then?

MISS BARTON: None whatever.

PROF. GORDON: How did he express himself?

MISS BARTON: By signs, very graphically.

PROF. GORDON: Could he read the lips at all at that time?

MISS BARTON: No.

PROF. GORDON: How did he acquire language?

MISS BARTON: From his lip-reading.

PROF. GORDON: Has he made a practice of reading books?

MISS BARTON: Yes, but he reads from the lips constantly. He is in communication with the shop boys when in market, and talks with them all the while. He loses the sense of sentences and does not like studying from books.

PROF. GORDON: This is an interesting case, we would like to know more about him.

DR. BELL: I should judge from the sound of his voice that he has some hearing.

MISS BARTON: He has none at all.

DR. BELL: That renders it still more strange. At what age did he become deaf?

MISS BARTON: We don't know. He came without any language three years ago, and apparently had no hearing.

MR. LYON: How long a time is he in school?

MISS BARTON: He is in schooll all day, and supports himself by working at night. He is now janitor of a Turnverein Hall and also has support from the State. He has no friends or relatives that we can find.

[He was then handed Dr. Bell's address before the Kendall Green Literary Society, Though he could not read the text out of the book he would read from Miss Barton's lips, and then with his eyes upon the page would follow as far as she had dictated in an intelligible manner and with a fairly correct rendering of the pronunciation of the words. She then questioned him with regard to the meaning of what he had read, and it was found that he could understand the meaning of what he had spoken; that he had an understanding of many words. One of the words that occurred was "invite." She asked him what "invite" meant; and he with a gesture said, "It means to invite anybody."]

DR. BELL: It would be very interesting to know something of the history of this lad before he came to you. Do you know anything of it.

MISS BARTON: I know very little of it. It is very painful to him o be questioned about it.

DR. BELL: Perhaps he could reply to you if you asked him whether he has talked to people?

MISS BARTON: He does not remember talking to any one.

[Dr. Bell wished to discover if he could hear at all, and he said he could hear the church bells ringing when he walked on the street, or could feel them.]

DR. WILLIAMS: Was his voice as natural at first as it is now?

MISS BARTON: He had no voice.

DR. WILLIAMS: That has all been developed.

MISS BARTON: Yes, it has.

DR. WILLIAMS: When he began to use it what sort of a voice was it?

MISS BARTON: It was not much of a voice. He was always very sensitive about it and used very little voice.

DR. BELL: Was it like the voice of other deaf children in your school; because the voice strikes us now as remarkable in quality?

MISS BARTON: I cannot account for it except from the fact that he reads the lips so well.

DR. BELL: Do you think it can be a case of a revival of speech?

MISS BARTON: Possibly. He seems to be a remarkable phenomenon

MR CROUTER: Does he remember anything about his early life? Does he ever refer to any serious illness or injury?

MISS BARTON: No.

MR. WESTERVELT: May I ask does he hear a jar easily?

MISS BARTON: Yes, he notices very easily.

MR. CROUTER: Could you give any theory to explain his remarkable progress. I think the case of a young man born deaf, without instruction until three years ago and in three years accomplishing what he has is the most remarkable that I have heard of. We would like you to explain a little.

MISS BARTON: I don't know that I can explain. It does not seem to me any more remarkable than the progress of Helen Keller.

MR. CROUTER: What method did you begin with?

MISS BARTON: I began talking to him.

MR. BOOTH: Didn't you name things first?

MISS BARTON: Yes.

MR. BOOTH: And you did not spend any time teaching the elements?

MISS BARTON: No, not at first, but later.

MR. ROE: Are we to understand that his lip-reading commenced before he came to you?

MISS BARTON: Not at all.

MR. BOOTH: How does he give the back sounds?

MISS BARTON: By imitation. It seems to me so natural he should speak as he does, lip-reading as he does.

MR. BOOTH: Why can't the rest of the deaf children get it the same way, without symbols?

MISS BARTON: I don't know.

PROF. GORDON: He does not seem to do a great deal with books. What is the bent of his mind?

MISS BARTON: He thinks swinging clubs is a great object in life. It appears that someone has told him he can make his living at that.

PROF. GORDON: Has he manifested inventive ingenuity?

MISS BARTON: Yes, but I think because of his desire to make money he is devoting himself to club swinging. I came very near losing him a short time ago. He was made to believe that there was a great fortune in club swinging, and he thought he would go to Massachusetts and coin money.

MR. CROUTER: This is another Helen Keller.

MISS BARTON: I don't think he is as wonderful as Helen Keller.

MR. CROUTER: Did you use the same method with him as with the other pupils?

MISS BARTON: I could hardly use the same method.

MR. KIRKHUFF: I wish to relate an anecdote in regard to this boy. A few days ago in shaking hands with him I noticed on his hand a large lump. I asked him how it happened. He said he did not know. I asked him whether he could remember anything about it and how he thought it must have happened. He said he must have broken it, he did not know where or when. I remember things ever since I was a boy. This boy seems to have a blank in his life.

A few years ago I read in the newspapers of a man who came from Massachusetts and who established a store in a place and entered into business and pursued the business for some time. One evening, I think after two or three months. he woke up and found himself in a strange place. How he got there he could not tell. He inquired of his neighbors and no one knew him. He found out

that he was keeping a store in that town. He then recollected that he came from Massachusetts and after fixing up his business he returned to the place from whence he came. Still that man possessed intelligence, was able to do business and talk upon any subject. This may be a case of a similar kind. Perhaps you have read the story of Archibald Milnor. This may be similar to that. It is a remarkable case, and it may be that this boy may return to another state entirely different.

MISS BARTON: It does not seem to be a case as remarkable as that. Then again he has remembered a good many things in his past life. He remembers where he worked on a farm the summer before he came to Portland, that is the summer of 1886, and the summer before that he can go back to, and before that again he was making shingles.

DR. BELL: I will now answer some of the questions that have been propounded to me.

The first question is: What is accent?

I have found in my past experience that accent is length. At least that we get more natural effect from a deaf child if we give him the idea of making the accented syllable longer than the others rather than louder. The attempt to make the accented syllables louder often leads to a jerky utterance very unlike the effect we desire.

To make my meaning clear I will say that I do not think that we give a jerk of the abdominal muscles for every accented syllable, any more than the piper gives a jerk of the arm to mark the accented notes. The pressure upon the bag is continuous and the rhythm of the music is brought out by the differing durations of the notes. Of course the music may be made louder or softer by increasing or diminishing the pressure upon the bag, but this effect corresponds more to emphasis than to accent.

The fact that the effect of accent can be produced by lengthening the duration of a syllable, without any change in the loudness or volume of the voice may be demonstrated by a simple experiment.

Let a deaf child prolong the voice while you manipulate his lips so as to produce əɪəɪəɪəɪ, etc. (Mamamama, etc.) Now, although he makes no variation in the loudness of his voice you can with your fingers produce the effect of accent by prolonging the syllable you desire to bring out. For example: If you prolong the open position you can make him say əɪəː əɪəː, etc. (Mama, pronounced in the English way with the accent on the second syllable) or əːəɪ əːəɪ.

etc., with the accent on the first syllable, as is very commonly heard in America.

"But," you may ask, "May not syllables containing short vowels be accented, and how can you prolong the syllable if the vowel is short?"

Certainly, syllables of this kind can be accented. In such cases you do not prolong the vowel but the succeeding consonant. For example: You can by manipulation cause your pupil to say ə|ə]ə ə|ə]ə, etc., (mamŭm mamŭm, etc.), by prolonging the closed position of the lips instead of the open.

There is a great point here. Short vowels are succeeded by long consonants; for example: the consonant position is retained for a much longer time in such words as come, cuff, it, sin, look, than in such words as, calm, calf, eat, seen, Luke. You can demonstrate this prolongation of the consonant position by emphasizing with great force the word "not" in the familiar quotation, "To be or NOT to be; that is the question." The hiatus caused by the prolongation of the shut position (ʊ) of the *t* is so great as to occasion a perceptible silence in the midst of the sentence.

Let your pupils pronounce with precision the accented syllables of words and slur over the others, articulating them rapidly, with indefinite vowels, and the effect will be much more natural than a precise articulation of every syllable with loudness for accent.

Miss McCowen: Have you ever thought of there being a difference in pitch?

Dr. Bell: I don't see how that could come into the case. In natural speech the pitch of the voice is constantly varied in both accented and unaccented syllables. You can distinguish the element of accent even though the voice is on a monotone and without variation of loudness.

The next question on my list is: "Please imitate Helen Keller's voice."

I am sorry I have not a sufficiently distinct recollection to do that. Perhaps Miss Fuller can.

Miss Fuller: I don't think I can.

Dr. Bell: I will say it was distinct and perfectly intelligible to persons not accustomed to the deaf.

The next question on my list is: "How would you teach *r* and *l*."

I have experienced so little difficulty in teaching *r* and *l* (ɷ and ω) that I am inclined to think that the very defective manner in which

these sounds are sometimes given by deaf children must be due to the mode of teaching. I always commence with the non-vocal forms ʊ and ω. I would recommend you to adopt this plan generally in dealing with consonants as the non-vocal forms are usually more easily acquired than the others. It is especially advisable in the case of *r* and *l*, as you then avoid the common fault of too large aperture. When the non-vocal forms have been mastered, the vocal forms follow as a matter of course by the addition of voice.

In forming ʊ (non-vocal *r*) the point of the tongue is applied to the upper gum just at the part where the palate begins to arch, and the breath is allowed to escape through a central aperture. Deaf children acquire the sound very readily by imitation, as the whole mechanism can be seen in a mirror. In any case of difficulty I manipulate the sound from ʊ̈ (*th*) or ʊ̈ (*s*) in the manner described to you the other day. It is quite unnecessary to attempt a "trill" that is, to cause a vibration or trembling of the point of the tongue. Such an effect is un-English.

The defective variety of *r* most commonly met with results from placing the point of the tongue too far back in the mouth. For example :—It is often applied to the top of the hard palate (ω^); and in some cases it is coiled up within the mouth so as to approximate the soft palate (ω^c).

The defective form of *l* so common in schools for the deaf results from an exaggerated narrowing of the tongue (ω^v) (too large aperture) and from opening the jaws too widely.

Sometimes the tip of the tongue is placed against the upper teeth and the under side of the tongue is actually protruded from the mouth.

The correct position for ω (*l*) is so nearly the same as that for ϖ (*n*) that the deaf have difficulty in distinguishing one from the other by eye. This leads some children to substitute ϖ for ω (*n* for *l*.)

In forming ω (*l*), the point of the tongue should be placed against the upper gum, and air allowed to escape through two side apertures. The lingual position for ϖ (*n*) is the same, excepting that the two side apertures are closed. Thus, the tongue appears slightly broader for ϖ (*n*) than for ω (*l*). The exaggerated narrowing of the tongue so commonly associated with *l* results in side apertures that are much too large. This defect is avoided, if you commence by teaching the sound non-vocally (ω) with quite small side apertures. Even pupils who give *n* for *l* readily acquire the

non-vocal form (ɷ). After this has once been mastered, the vocal form follows as a matter of course by the addition of voice (ɷ).

Even though ɷ and ɷ (*r* and *l*) may be given correctly as elementary sounds, deaf children produce an effect that is not heard in ordinary utterance when they attempt to give these sounds after non-vocal consonants. Thus, ʊɷʃ (tree), ʊɷʃɒ (sleep), etc., sound as if there were two syllables in each word, and if any defect of combination exists, the vocality of the *r* or *l* causes the introduction of a voice glide after the non-vocal consonant. Thus, ʊɪɷʃ, ʊɪɷʃɒ (tŭree, sŭleep), etc.

I have found that deaf children give the proper vernacular effect when they attempt to make the sounds non-vocally. Thus, ʊʊʃ, ʊɷʃɒ (tree, sleep). The same may be said of the sounds ɜ and ɱ (*w* and *y*) after non-vocal consonants; for example, when deaf children attempt to say ʊɜɭɷʊʃ, ɑɱɬ (twenty, cue, *i. e.*, kyou), they are apt to give ʊɬɭɷʊʃ, ɑʃɬ (too–enty, kee-oo), although the distinction between the consonant and vowel forms ɜ–ɬ and ɱ–ʃ (w–oo and y–ee) may have been fully explained to them. The vernacular effect, however, is at once produced when they try to give the sound non-vocally, ɔ and ɲ (wh, yh). For example, ʊɔɭɷʊʃ and ɑɲɬ (twh-enty and k–hue). I would adopt the rule of teaching deaf children to give *r*, *l*, *w*, and *y* without voice (ʊ, ɷ, ɔ, and ɲ), where they follow non-vocal consonants in the same syllable, for example, in such words as pry, try, cry, fry, thrice, shrine; play, clay, flay, slay; twin, queen, swim; pew, tune, cute, few, thews, sue.

Vocal consonants, when they occur as final elements, are pronounced by the deaf in such a manner as to offend the ordinary ear, and I think it worth while, therefore, to direct your attention to a simple expedient by which the effect may be much improved. For example:—take such words as love, nose, smooth, rub, good, bag, etc., when they occur by themselves or at the end of a phrase.

The vocality of the last element produces an effect that is at once recognized as peculiar. The effect is much improved when the pupil is taught to finish off with the non-vocal form of the consonant softly uttered. Thus ɷʃɜɜ (luvf) ɯɬɧɯʊ (noze) ʊɜɬɯʊ (smoodhth) ɷʃɘɒ (rubp) ɵɬɷʊ (goodt) ɘɭɘɑ (bagk) etc.

When two vocal consonants end the last syllable uttered, it is better to give the last consonant non-vocally. Thus: ɭɷʕ (edge), instead of ɭɷʕ; (edsh, instead of edzh); ɷʃɜʊ, instead of ɷʃɜ ʊ,

(duvs instead of duvz), etc. When such words occur in the middle of a phrase the latter pronunciation is correct.

MISS BARTON: How do you get pupils to give long e easily?

DR. BELL: I always teach first the non-vocal form ᘐ (*h* in hue). If a pupil does not give this readily, I manipulate it from ᘯ (*th*) or ᘓ (*s*) in the manner I have already described. When ᘐ has been well fixed—that is, when a pupil can give it readily without manipulation, I add voice.

At once we get ᘎ (*ee*) or, what is practically the same thing, ᘏ (*y*).

The next question on my list is this:

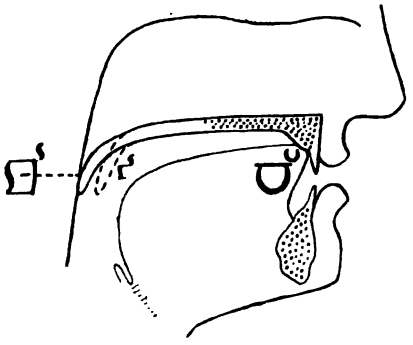
"Please demonstrate the teaching of *tn* in cotton."

In this word, (ᘋᘇᘓᘮ) the sound of *n* alone (ᘮ) constitutes a distinct syllable. Indeed ᘭ (*m*) ᘮ (*n*) ᘦ (*ng*) and also ᘡ (*l*), when prolonged, are in reality vowels. That is, the aperture through which the voice is passed is so large as to be non-obstructive. We fail to hear any rustling or hissing or puffing sound from the mouth position. The fricative noise which is characteristic of a consonant is not heard excepting at the moment of the relinquishment of the position. These sounds can be used both as consonants and vowels. If the positions are assumed only momentarily so that the sound of the removal of the position is the chief effect perceived, then we recognize the sounds as consonant elements of speech. If on the other hand the chief effect perceived is due to the retention of the position, and not to its removal, we hear only a quality of voice, that is, a vowel sound, and this sound may constitute a distinct syllable by itself.

In the English language ᘮ (*n*) and ᘡ (*l*) are often employed as vowels. ᘭ (*m*) is more rarely used, ᘦ (*ng*) not at all. A vowelized ᘭ (*m*) is not usually recognized as constituting a distinct syllable by itself, but surely such words as ᘡᘎᘯᘭ (rhythm) and ᘏᘎᘯᘭ (schism) are as really dis-syllabic as ᘎᘓᘮ (eaten), ᘋᘇᘓᘮ (cotton), or ᘌᘓᘡ (apple). The termination, "ful," which is so often murdered by deaf children is pronounced by most people simply as ᘕᘡ (fl). For example: ᘇᘕᘡ (awfl), ᘓᘡᘌᘓᘕᘡ (dreadful), ᘐᘍᘂᘏᘎᘕᘡ (beautiful), etc. Surely the word ᘇᘕᘡ (awfl) would be more acceptable to ordinary ears than the ᘇᘕᘃᘐᘁᘡ pronunciation commonly heard from the deaf.

It is difficult to teach the sound of *tn* in such a word as cotton without the use of symbols. The pupil associates the single character *t* with a double action of the organs (ᘏ-). Hence, he

tries to give this double action to the *t* in cotton; that is, ᗝ-ᗯ for ᗝᗯ. The vocality of the ᗯ (*n*), however, usually causes him to fail in his aim, so that the puff of air (-) is vocalized (I). Thus, ᗡɟᗝIᗯ. In our pronunciation of the word the point of the tongue is not removed from the upper gum between the positions for *t* and *n*, ᗡɟᗝᗯ. The point-shut position is common to the two sounds ᗝᗯ. The soft palate is closed against the back of the pharynx (ᗤ) during the production of the *t* and drops (ᑕ) during the production of the *n* (see dotted lines in Fig. 16), thus allowing the voice to pass through the nose.



First Position. ᗤ + ᗝ = ᗝ
Second Position. ᑕ + ᗝ = ᗯ
ᗝ + (ᗤᑕ) = ᗝᗯ

Fig. 16. Action of the soft palate in forming *tn* (ᗝᗯ) in "cotton."

Repeat the sound *tn* a number of times without voice (ᗝᗯᗝᗯᗝᗯ etc.), and you will feel that the whole action consists in the alternate elevation and depression of the soft palate (ᗤᑕᗤᑕ etc). The point of the tongue is not moved at all, but is shut continuously against the upper gum. ᗝᗯᗝᗯᗝᗯ=ᗝ+ (ᗤᑕᗤᑕᗤᑕ etc.).

There is only one point-shut position. Now, such an action presents no difficulty to a child who has been taught to elevate and depress his soft palate at will, but does present enormous difficulties to one who has not, for the whole action is invisible. All you can do in such a case is to use symbols, and show that the shut position (ᗝ) of *t* (ᗝ-) is alone assumed, followed by ᗯ (*n*) without moving the tongue. The combinations ᗝᗯ (*tn*), ᗯᗝ- (*nt*), ᗯᗯ (*dn*), ᗯᗯ- (*nd*), ᗝᗯᗝ- (*tnt*), and ᗯᗯᗯ- (*dnd*), occur in English words, some of them quite frequently; and I think therefore that deaf children should be taught to control the movement of the soft palate so as to be able to

produce these combinations at will. For example: The words: ᒥᑐᑫ (eaten), ᒪᑫᑐ› (ant,) ᕮᒪᑫᑫ (madden), ᒪᑫᑫ› (and), ᑕᒪᑐᑫ› (patent), and ᕮᒪᑫᑫᑫ› (maddened), involve these actions. The word "abandoned," as pronounced by some people ᐃᕮᒪᑫᑫᑫᑫ› actually involves four point-shut sounds successively uttered, or rather one point-shut position, and four successive positions of the soft palate. ᑫᑫᑫᑫ=ᑫ+(ᑕᑎᑕᑎ)›.

In difficult cases I would recommend the following plan: Give your pupil a hand mirror and teach him to elevate and depress his soft palate (ᑎᑕᑎᑕ, etc.), in the manner described in my second lecture.

When he can do this at will without looking in the mirror, ask him to repeat the exercise with his lips shut all the time. This results in ᑕ+(ᑎᑕᑎᑕᑎᑕ etc.) = ᑕᑕᑕᑕᑕ etc.

Then repeat the exercise with the point of the tongue shut against the upper gum:

ᑐ + (ᑎᑕᑎᑕᑎᑕ, etc.,) = ᑐᑐᑐᑐᑐ etc.

Then with the back of the tongue shut against the soft palate:

ᑲ + (ᑎᑕᑎᑕᑎᑕ)=ᑲᑲᑲᑲᑲ etc.

Then let him repeat these exercises with the voice sounded intermittently through the nose:

ᑕᕮᑕᕮ etc. (pm pm etc.)
ᑐᑫᑐᑫ etc. (tn tn etc.)
ᑲᕮᑲᕮ etc. (kng kng etc.)

Then with the voice continuously sounded:

ᕮᕮᕮᕮ etc. (bm bm etc.)
ᑫᑫᑫᑫ etc. (dn dn etc.)
ᕮᕮᕮᕮ etc. (gng gng etc.)

If a pupil is taught to control the movements of his soft palate at will, such combinations as that of *tn* in cotton will present no difficulty.

[Dr. Bell here illustrated his method with Mr. Kiesel.]

I would like to say if there are any representatives of schools present who have not given us any account of their articulation work, I would request them to consult with either Miss Yale or myself, that we may make time to hear them on the subject of articulation work in their schools. In that connection I know we shall be very glad if Mr. Roe will give us any information concerning articulation work in his school in Great Britain.

(*The meeting then adjourned until 9 p. m.*)

LAKE GEORGE, FROM CALDWELL.

TRAINING OF ORAL TEACHERS.

WEDNESDAY, JULY 8, 1891.—9 P. M.

MR. E. S. THOMPSON: I would like to suggest to the Association a plan which I think could be successfully carried out with regard to the training of oral teachers, the establishment of schools for their training being one of the objects of this Association. The common idea of a school is that of a fixed place where instruction is given; but that is not all that a school can be. One of the greatest schools as far as numbers go, and one also of the greatest as far as usefulness goes in this country is one of which the majority of its pupils have never seen the headquarters. I refer to the Chautauqua Literary and Scientific Circle. By the formation of reading circles outside of the headquarters a great deal of good work is being done and the results are sent on prepared memoranda to the head office.

Now the proposition that I would make is, that we also should have a reading course in connection with this Association, by which the great work which is being done at Northampton could be extended to all the members of the profession. I would suggest that the courses be somewhat as follows: General History of Deaf Mute Education, Comparative Study of Methods Used, Anatomy and Physiology of the Throat and Ear, Speech-Teaching and Lip-Reading, The Mechanism of Speech and the Formation of Sounds.

These courses could be directed by members competent to do so. Those of anatomy and physiology by doctors. Dr. Hewson is perfectly willing to do anything in his power to aid us. He doubtless would assume the direction of the course on the throat, and Dr Sexton perhaps would assume that on the ear.

The Association has appointed an agent whose business it is to visit schools. This agent could assist in their studies the teachers

at the schools where she visits. At the close of the year the memoranda prepared could be sent in, showing the work that had been done, and how it has been done. Then at the summer meeting examinations could be held, and upon the results of these examinations could be given scholarships and bursaries, such as were suggested by Dr. Bell in his opening remarks.

The President: This idea of Mr. Thompson's was brought to my notice for the first time to-day. It is a novel idea, but one which I think is practicable. We are to have a meeting of the Board of Directors immediately at the conclusion of this meeting, and if there are any suggestions we should be very glad to hear what the members of the Association have to say. This is an entirely new proposition and has not been discussed as yet.

MR. WESTERVELT: This seems to be a most desirable plan for the Association to enter upon, and it is to be hoped that it will be freely discussed. It may be that some of our members are acquainted with the literary work of the Reading Circles of the Chautauqua Association, and can tell from their experience the ways in which we can make a reading circle most profitable to the promotion of teaching speech to the deaf. The teachers of the school I represent would be glad to take part in work of this sort. It is our purpose to provide a good library upon subjects connected with the teaching of speech, but such a reading circle will stimulate our interest in the use of books we have, and enable us to have the use of books of which we cannot obtain the ownership.

MR THOMPSON: I will state from my experience that the good which I realized from the Chautauqua Reading Circle led me to suggest it in this connection.

MISS JORDAN: I would like to ask if the idea is to adopt any particular method?

MR. THOMPSON: Oh, no, we will study all methods.

THE PRESIDENT: I would like to read the Association a letter I have received from Dr. Samuel Sexton, of New York City, regretting his inability to be present to deliver his lecture.

MY DEAR DR. BELL:— 12 WEST 35TH STREET, NEW YORK, July 7, 1891.

You can scarcely imagine how greatly I am disappointed in not being able to meet you, as I had intended. Indeed, my notes were made and my preparations and models packed, when my expected patient, (of whom I spoke) arrived and objected to my leaving her so soon after the operation. I regret this the more that I feel I might do some good in a direction where you, (as well as myself, I may say) have such an interest.

Hoping that your meeting will in every way prove a success, I remain,

Yours sincerely,

SAMUEL SEXTON.

I very much regret that Dr. Sexton is not able to be present for he had a discovery of the very greatest importance and interest to us to impart. He would have told us of the results of the first successful attempts to use surgery for the relief of deafness. He has devised a very remarkable surgical instrument by which a person suffering from catarrhal deafness can be relieved. I had an opportunity of seeing his first patient very shortly after the operation had been performed. She had become totally deaf in one ear from catarrhal deafness, and was fast losing the hearing of the other. Dr. Sexton obtained her permission to operate upon the ear which was totally deaf. She was placed under ether. The operation consisted in making an opening through the membrane of the ear and simply severing the little chain of bones, leaving the stapes free.

You know the internal ear consists of a cavity filled with fluid, in which the cochlea is, and it has two openings known as the oval window and round window. In the oval window, the stapes fits like a piston. The round window is closed by a membrane. Now the stapes is connected by a chain of little bones to the drum-head membrane of the ear. Dr. Sexton's theory, I think, is that the chain of bones connecting the drum-head with the internal ear becomes immovably united, so that they become incapable of transmitting acoustical vibrations in a proper manner. The conducting mechanism of the ear then forms an obstruction to the transmission of sound instead of facilitating it. He snipped this little chain of bone so as to leave the stapes free, and when the young woman awoke from her ether sleep she found she could hear. I carried on a conversation with her from the other end of the room.

Since then the operation has been performed upon quite a large number of cases. In New York, a short time ago, Dr. Sexton gave me the statistics of these cases, from which it is evident that a very wonderful advance has been made in aural surgery. It would have been of the greatest interest to us if we could have heard Dr. Sexton's lecture.

DR. WILLIAMS: Do you know whether this has been successful in all cases?

THE PRESIDENT: I don't know that, but the statistics are sufficiently strong to warrant the operation being performed. It has been successful I understand in a considerable proportion of cases. I had an opportunity of testing the result in the first case myself and it certainly seemed good. The sound vibrations seem to act upon the membrane of the "round window" in the middle ear. Certainly

there is no doubt that a person can hear without any connection between the drum membrane of the ear and the stapes. I am very sorry that Dr. Sexton is not here to describe to us the operation himself.

DR. WILLIAMS: I saw a man who had been almost totally deaf and who had the drum of the ear destroyed by acid, so that the drum was entirely removed. He had a false membrane of silk made and he could hear very readily.

MR. BINNER: I would like to ask if all these operations have been successful, and, if not, what the results have been.

THE PRESIDENT: I have not sufficient information to answer that question. I was looking forward with as much interest as anyone to the opportunity of questioning Dr. Sexton upon these points. That some of these operations have been successful there is no shadow of a doubt.

MR. WESTERVELT: I should like to know whether the bones Dr. Sexton removes simply makes an incision in the tympanum.

THE PRESIDENT: The operation simply consists in snipping the little chain of bones close to the head of the stapes, so as to prevent them from uniting again. Of course it is a wonderfully delicate operation, and Dr. Sexton would have brought with him the ingenious apparatus devised by him for the purpose of the operation.

MR. BOOTH: What is the theory upon which he works?

THE PRESIDENT: The theory, as I understand it, is, that in catarrhal deafness the conducting mechanism becomes unfitted to transmit vibrations and only forms an obstruction to the passage of sound. He therefore makes a permanent opening in the drum-head so that the vibrations may reach the membrane of the "round window" in the middle ear. He snips across the chain of little bones, leaving the stapes free in the oval window.

MR. LYON: It is possible I could give a little experience in regard to the ear that would be of interest. I have suffered somewhat from that same cause. I had trouble with the hearing of one ear, but upon investigation, it was found that the cause of the trouble was in the throat, inflammation from which had affected the eustachian tube, so that the air within the ear had become rarefied, and there was no possibility of restoring equilibrium because the connection was cut off between the throat and the ear. This rarefaction drew the ear drum in and held it stationary, so that it was impossible for it to vibrate. Held in that position, the ear drum not having

exercise became thickened; that was probably the case in the subject which Dr. Bell referred to.

MR. WESTERVELT: Perhaps it is due to that experience of Mr. Lyon's that we now have the Lyon Phonetic Manual.

MR. LYON: No, I began to work on my first manual before I had the difficulty with my ear.

Adjourned until 9:30 the following morning, at which time Dr. Bell delivered his lecture on "Vowels, Glides and Combinations," a report of which will be found in the proceedings of Friday, July 10.

SPEECH IN A MANUAL ALPHABET SCHOOL.

THURSDAY, JULY 9, 1891.—10:30 A. M.

Mr. Westervelt: The school which I represent was named in the programme a "Manual Alphabet School," at the suggestion of our President. I should prefer to have the school designated otherwise than as "manual," if any other word could equally emphasize the feature which distinguishes the school at Rochester from other oral schools. Few words could arouse the objection that the word "manual" is apt to excite among oralists, many of whom believe that there is no reason for using, with deliberate purpose, anything that is manual in a school which claims to have for one of its principal objects, the teaching of all its pupils to speak.

This opposition on the part of oralists to the use of manually spelled English may be owing, in part, to the error of confusing the manual alphabet with "the sign language," an error quite common with those who are unfamiliar with either the language of gesture signs or with manual English. It is true that the letters of the manual alphabet are signs; and so also are the positions taken by the lips in speech, and letters in printed and written words as well. "Words are signs of ideas;" all intercourse is carried on through signs, but not necessarily through "The Sign Language." This is the name which has been given to the language of gesture devised by De l'Epée and adopted by the elder Gallaudet as the basis of education for the deaf. It is this language, with the form of what may be called its conventionalized signs for ideas or words, somewhat modified and its vocabulary enlarged, which, through the direct and indirect instrumentality of schools has now become the vernacular language of a large portion of the deaf-mutes of America. I have had an almost life-long familiarity with this language and enjoy its use with

those deaf-mutes who have been made dependent upon it, but positively oppose its use with or by deaf school children. Much of the confusion that is apt to enter into the consideration of the methods of educating the deaf would be avoided if, instead of the word "signs" to designate the language of conventionalized gesture-signs-for-ideas, we were to use the name, the "De l'Epée" or "Gallaudet" Language. While there is no connection between this De l'Epée or Gallaudet language and manual spelling there is at the Rochester school a vital connection between manual and oral utterance of English.

The term "finger spelling" has also led to some confusion with regard to the work of a manual alphabet school. In intercourse through the hand, words are not "spelled" in the sense in which that term is generally used. There is no labored putting together of broken-up words, fragment by fragment, with puzzled uncertainty as to what particular pieces are required to give to every word a conventional form. One of the leading educators of the deaf, in an able paper presented at the National Association for Charities and Corrections some years ago, held that the deaf, if taught through a manual alphabet, would think the separate letters each as a separate sign of a distinct concept. When some of our pupils who were accustomed both to speak and to spell were given this article to read, they stated that they did not think that the deaf were any more conscious of the letters or visible elements comprising the words that they used in manual intercourse, than they were of the vocal elements of the words they used in speech. I do not think there is any greater consciousness of the separate manual positions when our pupils are "spelling" or reading "spelling" on the hand, than there is of the letters we see when reading the printed page.

Objection to the manual as a medium for inter-communication and for instruction has been quite universal with educators of the deaf. Oralists who have had to work against opposition in every form, fear that it is the language of gesture signs in disguise, and that the deaf accustomed to use the manual alphabet will be antagonistic to speech and speech-reading. While those who believe that the deaf need a language of conventional gesture signs to interpret conventional English signs for ideas, object to the manual alphabet because it is not "the (gesture) sign language," and they do not believe that the deaf can find it a sufficient and satisfactory means of intercourse. But at Rochester we are convinced that our pupils have in manual English a ready vehicle for expressing thought

which is also a positive help in the acquisition of speech and of speech-reading. Ours is an oral school upon a basis of manual, visible English.

Schools where the deaf are taught reading, writing and speech abound, but a pure oral school in which reading and writing are tabooed, is hardly to be found in America. When teaching the deaf was in its infancy, and speech was regarded as a miracle, and when the acquisition of this power was the ultimate end of the teacher's work, and was regarded as sufficient compensation for any outlay of funds or years of labor, there were pure oral schools and pure oralists with whom it was consistent to interdict the use of print or script, or anything that was not speech and speech-reading. It has frequently been demonstrated that a bright child taught thus, by pure oral methods, will speak remarkably well, and it is easy to cultivate in the child so taught a habit of almost constant talking. The articulation of a child taught in this way would naturally be more accurate and perhaps more intelligble than that of the same child, should it, through the use of printed and written language, acquire an extended vocabulary and habits of thought in which longer and more involved sentence construction were needed for satisfactory expression. But restricting the pupil to language which can be read upon the lips and ignoring language in its orthographic form, is withholding from the deaf the opportunities for development and culture which, with the hearing are regarded as the principal objects of education, but there are few teachers of the deaf in America who call themselves pure oralists, and with those who do the name is assumed for emphasis rather than for strict definition. Some years ago, one of the first orally educated children in America was taken to Germany by her mother, for the purpose of obtaining advantages which it was supposed were afforded in its renowned pure oral schools. The mother was greatly disappointed to find that her American child had passed far beyond what was regarded by the pure oralists of Germany as the highest attainment possible to the deaf; they could hardly believe that the American child had not gained her familiarity with language and her cultivation of mind through hearing. This was not the case, however; the child's unusual development was due to the broad educational views of her teacher, who gave to the direction of her pupil's reading and the cultivation of her mind a larger share of her attention than she did to training her speech. Speech she regarded as of inestimable worth,

but only because it was to be the vehicle for the expression of thought from a full mind.

There is probably no one, hearing or deaf, possessed of a fair education, who has not gained the better part of the information of which he is possessed through manually spelled *visible* English—from language which is manual in its composition, with type or with pen.

This form of language, with those who hear, is acquired as a secondary step, because it is easier for the hearing to receive their elementary education through sound; for the same reason, because it is easier, it is natural to reverse this method with the seeing deaf, and let them learn first to use those forms of language which were designed to address sight, viz.: writing, printing and finger spelling. Though these are designed for the hearing they are equally adapted to the needs of the deaf; let the deaf then, as well as the hearing, use any of these several forms of English as they find them to be convenient, learning what they can see most easily as a primary step, and as a secondary step to read the same words upon the lips and to acquire the power to speak them to the hearing. There is no more reason to believe that the acquisition of speech and speech-reading by the deaf are retarded by manual spelling or writing, or by the reading of orthographic language, than there is to believe that the acquisition by the hearing of the art of easy and rapid reading and writing will be retarded by free and habitual intercourse through speech.

The use of printed and written language enters into the plan of work of all our American oral schools, and in the best of them much time and labor is given to writing and manifolding lessons, and to going over the manuscript, line by line, by the pupil's side. In the manual oral school much of this time is spent, not in writing upon paper, but directly upon the mind of the child, and the living words so engrossed carry with them understanding because their meaning can be intensified and impressed by all the arts of expression and the magnetic power of personality difficult to transmit through paper.

In teaching language through the hand it is our purpose to speak at the same time that we spell, for through inheritance of language habit and association of ideas the motion of the lips seems to lend meaning to the unfamiliar action of the fingers, and more readily awakens the child to apprehend the language purpose of finger utterance. It is my almost unvarying habit to speak as I spell.

It is one of the principles on which the manual-alphabet-oral method of the Rochester school was developed, that not only should the oral accompany the manual utterance on the part of the teacher, but the pupil should learn to think language in its oral form.

During a first period of instruction, the duration of which varies, the mind of the deaf child, taught through manually spelled English, acts through the hand, and, in thinking or studying, the fingers spell out the words that mould and express the thought, perhaps concealed or with inconspicuous movement, yet with a semi-conscious and persistent action, they give the physical basis and medium for reflection and study. The transition to thinking upon and through the vocal organs comes almost without conscious effort, through the natural adaptation of the organs to this use; as soon as the child has acquired freedom of thought in English through manual spelling and has received training in speech, he will find himself mentally articulating, thinking the oral forms of whatever words he spells or reads; with at first a conscious movement of the organs. As the mind grows familiar with language, however, its processes become less dependent upon muscular action, more facile and intangible, but with such mental utterance as, that, if it is protected with voice, speech is produced. The act of writing or of finger-spelling then becomes an accompaniment or expression of the oral thought, automatic in so far as it is familiar; conscious effort being given to the elements forming such words only as the mind is not used to, as speech also is automatic except with unfamiliar words. This mental speech may not be always correct, nor is it at all necessary to thinking in and through oral language, that it should be, but when it is not, the audible speech which it moulds, is incorrect also, as it is the mind that speaks through the vocal organs, and correct speech is given a child by correct habits of mental utterance rather than through automatic muscular repetition.

While we aim to have our pupils form such mental habits as that semi-conscious, inaudible speech is the mould and vehicle of thought, it is our purpose to give the principal part of the class instruction and general information through language in its most readily visible form, in a manual alphabet, script, or print, as we are convinced that, if with the enlargement of vocabulary there is given a correct knowledge of speech, the child will be able to speak and if properly encouraged will do so in its intercourse with the hearing. During the first period, while the child's most ready form of utterance is through his fingers, he accompanies his speech with finger-

spelling, as the little hearing child reads while it is learning, speaking aloud the name of the letters before it pronounces the word. The language is the same, whether spelled or spoken, and each form of it that is learned is a help to the learning of the other. Those of our pupils who are most fluent in manual spelling are the most fluent in speech. Good articulation is not dependent upon constant talking. In fact, constant talking by the hearing or deaf usually produces careless articulation. Pupils of higher classes who talk the most, need careful attention from teachers to preserve their speech from deterioration through use. Clearness and fluency of utterance is not the result of hard and constant talking so much as it is of clear understanding of what speech is, together with a free use of language. It is understanding which gives the power of exact and clear enunciation. Give the child correct ideas of speech and his speech will approximate ideal correctness. To impart this idea of the correct form of words we have long felt that if we could have a phonetic manual as distinct, as rapid, and as easily used as the orthographic manual we have been accustomed to, it would be a great advantage to our pupils. Years ago I tried, and have since tried to get others to devise such a manual. It was through an effort to induce a friend to take an interest in the subject that I learned of Mr. Lyon's invention of a phonetic manual. I made haste to become acquainted with it and to introduce it. Mr. Lyon at once entered into the work of teaching his manual in our school. But, as he has described to you, his first manual was founded upon a phonetic analysis less satisfactory for teaching the deaf than that of Prof. Bell, with which our school was accustomed. With the experience which he gained in our school-rooms, Mr. Lyon worked out a new phonetic manual, based upon Prof. A. Melville Bell's system of Visible Speech, so that we have now a satisfactory presentation of speech by the hand. Conversation through it is constant instruction in exact articulation. The new phonetic manual has been under process of development in the advanced portion of our school, and though it can hardly be said to be in general use, in the classes in which it has been used it meets every requirement. A difficulty we now find in its general adoption as a means of intercourse is the varied pronunciation of words. While the ear is not offended by this variation from authority, the eye, more exacting, requires for ready recognition conformity to some standard of pronunciation. Whether the phonetic manual can be used as rapidly as the other

manual, we have not tested, but it is easily used, and read at a rate of about eighty words a minute by a number of the pupils.

I understand from Prof. Gordon that the Rochester school is the first and only school of its kind, but that many years ago in Paris there was an individual instance of a child taught through a manual alphabet devised by the child's father. What the Rochester school aims to prove is that the English language in its visible forms is readily intelligible to the deaf, with no more explanation of words than is given to the hearing. The deaf child will acquire understanding of language through its use. We think it is reasonable to make manual language the basis for school intercourse and instruction with the deaf, who might be called the seeing, and as unreasonable to dispense with it as it would be to ignore speech in a school for the hearing. Miss Fuller's account of little Helen Keller, whose wonderful achievement in the almost immediate acquisition of speech after having first acquired considerable knowledge of language and fluency of expression through manual spelling, is in itself a refutation of any suggestion that manual intercourse conflicts with the use of speech.

It is expected that the pupils of the manual-alphabet-oral school at Rochester will talk with their parents and hearing friends at home through speech, and will not require their friends to learn the manual alphabet in order to talk with them. Those of our pupils who make only average advancement in school can still speak well enough to make their parents and friends understand, and can understand the speech from the lips of their friends so well as to make communication through speech and speech-reading more rapid than through the labored manual spelling of their hearing friends. We request parents and friends to resort to the manual alphabet only to help out defects in lip-reading and in reading unfamiliar expressions, as a more convenient recourse than writing upon paper. In the instruction of our classes of beginning pupils in the use of the manual alphabet, exactness in the orthographic form of words is not required. The attention of the pupil is directed to the communication of his thought rather than to forms of words. As with the first utterances of the little hearing child, whatever is intelligible is accepted; exactness in conforming to the conventionalized forms of words will come naturally at a later time.

Children in the kintergarten converse in finger-spelling at the rate of eighty to one hundred words a minute. I can spell as rapidly as I can speak. The rate of finger utterance is practically

limited to the rate at which thought can be formulated. We do not regard the number of words that can be used a minute, or the quantity of English the little child sees as constituting the greatest value of manual intercourse; but rather the fact that the child's every concept takes such a form in its mind as that when it is expressed it is uttered in English, and the child has confidence that whatever he thinks clearly he can communicate as easily as he thinks it. His manual intercourse is but an automatic accompaniment to mental speech, and phrases are produced with one uninterrupted movement of the fingers, with nothing to indicate the beginning and end of words.

Many teachers of the deaf object to any use of conventional gesture signs as a means of intercourse among their pupils, yet it is found to be practically impossible to limit young children gathered in a school to speech-reading during the period that precedes their attainment of a good degree of scholarship and familiarity with English. It is necessary to accept this condition of things, as the visible signs for ideas made by the lips are so inconspicuous and intermittent that little children are unable to communicate readily in this way, and if they make the effort to do so, they mouth the words, making such large signs with their lips as to make gesture signs seem the less of an evil. The little children's language requirements are readily satisfied in a manual alphabet school; with easily acquired, plainly visible English, their out of school intercourse by the fingers bring in the same words that, in their school exercises, they are taught to speak. Expertness in lip-reading, like expertness in speech, is not gained so much by the result of constant practice, as through knowing what to look for and what to do; not through the limiting of the acquisition of language to what can be acquired through this means, but to acquiring all language and information possible through other ways and making these means contribute to the end of good and ready speech. The most expert lip-readers I have ever met are those who were not dependent upon speech-reading for education or cultivation, who never looked at the lips until after they had gained education and free use of language. They are those persons who lost their hearing after they arrived at mature years. Then, having, through the necessity of intercourse, to find a substitute for hearing, they are able, because of their great familiarity with language, to become speech-readers with comparatively little study or effort. The skill acquired in reading rapid language from the hand

is the best possible training to the attention and to the eye for reading the lips.

In what has been published of the Rochester school so much attention has been given to the manual utterance of English that many are not aware that it is an oral school. The teaching of speech has always formed an important part of the work at the Rochester school. When the school began we had three teachers, two of whom were specialists in speech-teaching, having had, besides extended experience in the schoolroom, training in Dr. Bell's normal class in the Boston University School of Oratory. It has always been one of the principles of the school that all teachers should teach speech or speech-reading. It has always been the rule also, that all pupils should be taught to speak. A large share of the interest of every one, in any way related to the school, has been given to oral work, and to visitors mention is not usually made of the manual feature of our method of teaching, but their especial attention is directed to the training in speech and speech-reading. It is when talking with other teachers of the deaf with regard to methods of instruction that the peculiarities of the Rochester school are specially dwelt upon. Our teachers who are deaf have lip-reading exercises, the pupils in their classes repeating, as it were, aloud to the deaf teachers in the Phonetic Manual what they see upon the teacher's lips, at the same time that they speak the words aloud with their lips. The class training in speech of such pupils is, of course, conducted by the teachers of articulation who hear.

During the earlier years of our school the speech work of the kindergarten was under the direction of Mrs. Westervelt, the older pupils, were under the charge of Miss Hamilton. The younger children were taught and expected to speak what they were taught to spell. The simple words and sentences needed in the schoolroom, at the table, and about the house were taught them in school, and they were expected to speak these words and sentences whenever they had opportunity. The more advanced kindergarten children spoke quite constantly with their teachers and with those of the hearing members of the school with whom they were familiar; visitors of the school talked with them and understood them. Such free and constant use of speech by beginners was hardly compatible with nice and discriminating articulation, but the children spoke fluently, naturally, intelligibly, and without labor. Latterly, for purposes of experiment, we have undertaken to secure more careful and perfect articulation. To secure this a series of graded exercises

was prepared. The pupils were graded in their work in speech as they were in their other studies, by their ability to speak lists of words which were so arranged as to express different degrees of difficulty of articulation. The pupils begin to receive instruction in speech now in their second or third year in school, after they have gained considerable advancement in language. It is not considered desirable that the younger pupils should talk with others than their teachers until their understanding of the action of speech is definite and well established. During the several years which the school has been under the charge of Miss Hamilton this method has had opportunity for demonstration of results. We are able to see in our older classes good and fluent speech, and the speech in our younger classes, though it is not so fluent, is approximately exact.

I will leave the description of the graded exercises and charts which Miss Hamilon prepared, and other detail of her work for her to present at some other time.

DR. FAY : My friend, Mr. Westervelt, in stating just now his defense of the prominent, sign-excluding use of the manual alphabet in his school work, referred to a paper delivered at St. Paul five years ago, and quoted as one of its statements, something like this: that "in the use of the manual alphabet pupils are necessarily conscious of each letter as well as of the word itself which the letters compose." Being myself the writer of that paper, I will say I think he has misconceived the statement I made, and which he has sought to disprove by the reported consciousness of his pupils.

The gist of the statement I intended to make at St. Paul was this: that in the pure manual method there is a certain appreciable amount of time consumed, considerable in amount and much larger than is the case with the oral method, where we are able to pass words through our mind at the rate of three or four hundred words a minute, or with the eclectic method where signs are tolerated and which are equally rapid. In the use of spelled language it was held that we cannot pass words and ideas through our minds with equal rapidity. The point intended to be made in the paper was that while we undoubtedly have the full consciousness of words, as units, there must also exist in the mind a sub-consciousness of the elements of the same words, and that this consumes a certain amount of time, and time is sometimes worth more than money. This is really a very strong argument for the teaching of speech, because you get in it an instrument of thought that is sharp and

rapid. The question of rapidity in thinking was the point intended to be made.

MR. WESTERVELT: There is no question that oral speech is what we want. I agree with Dr. Fay in this.

THE PRESIDENT: I am sure we must all have been struck with the remarks of Mr. Whipple quoted by Miss Yale and dated back to 1830; those were remarks of the older Whipple. The younger Whipple I remember as a very successful teacher of articulation. Looking back upon the past I think we must all recognize the fact that history has done neither of them justice yet. I have searched the records of the Annals for any description of the ingenious, "natural alphabet," devised by Zerah Whipple. I have searched the Annals in vain for a description of his method of teaching. He has gone from us and his methods are no longer in use. Would it not be of interest to this Association to hear of those methods, and to preserve for the information of others the alphabet and the methods he devised.

We have with us to-day Miss Daisy Way, a pupil of Mr. Zerah Whipple, who has come all the way from Kansas City to perform a sacred duty in behalf of her deceased teacher. She will not have him forgotten and comes here to tell us of his labors and his life Allow me to introduce Miss Daisy Way.

THE WHIPPLE PHONETIC MANUAL.

THURSDAY, JULY 9, 1891:—12.30 A. M.

MISS DAISY WAY: An interesting fact has been developed by the several able historical articles which have been read before the present meeting. History furnishes not one instance only, but numerous cases in the course of the development of articulation, where a particular system of the teaching the deaf has virtually ceased to exist at the death of the originator, just as a valuable receipt is carefully guarded within the laboratory of the chemist who alone possesses the secret of the ingredients, and which locked within his own personality perishes with the mistaken being when the uncertain tenure of life is inevitably relinquished Posterity can only, by the most careful and painstaking inquiry, form the remotest conjectures of the actual value of the mysterious compound, if indeed sufficient interest is at length aroused to elicit any extended inquisition, and in studying various systems of education long after the pioneers in the struggle have passed from the scene of their labors, we are especially liable to underrate the true depth of their reasoning, the extent of their researches and the perfection of the ideal they strove to attain. Of a period, fortunately not so remote, but as yet comparatively obscured, and of a benefactor and an invention alike unappreciated and unknown, a brief and inadequate history has been prepared, not by an enthusiastic inquirer, in this case, but by a direct beneficiary of the man and of his life work, a grateful task and one profoundly appreciated.

The Natural Alphabet and the system of teaching, of the late Mr. Zerah C. Whipple of Mystic River, Conn., have through a series of most unfortunate circumstances hitherto remained in obscurity.

The fact alone of the absence of any record of the matter has

been largely responsible for the lack of interest thus far displayed, but a demand has at last been made for more definite information, in order that a measure of justice may be accorded the memory of this gifted inventor, of which his life-time was unfortunately deprived. Only those who knew and loved him best could properly gauge the extent of his genius, and while a local celebrity and appreciation was freely bestowed, in the broader field of educators; where his talent would have been reflected with added lustre, he was almost unknown and entirely unrecognized.

As a pupil of Mr. Zerah Whipple, I am thoroughly familiar with the symbols of the Natural Alphabet, but in attempting to furnish a detailed and authentic record of his system of teaching, I am conscious of my inability at present to do the subject commensurate justice. During the sixteen years which have elapsed since my instruction at the school of Mr. Whipple, I have had no occasion to refer to the matter, and the present requisition was so unexpectedly made that no time for research or comparison has been possible. There are many details which I am at present unable to supply and possibly some discrepancies will occur which are unavoidable, but which I shall hope to correct at some future time. I am actuated only by a deep sense of gratitude I owe to the memory of the benefactor whose highest aim and sole impulse was to better the condition of those who are afflicted as myself, and even an incomplete and unsatisfactory tribute will at least do its part toward securing for the matter the attention it so evidently deserves.

I am glad to say that I have with me my mother, who is cognizant of many details of Mr. Whipple's system from the fact of her residence at the school during the term of my instruction, and in the course of discussion, should any questions arise which I am unable to answer, I shall beg to refer you to her.

The germ of the idea seems to have developed first in the mind of Mr. Jonathan Whipple, the grandfather of Zerah Whipple, who was afterwards destined to inherit and further develop the philanthropic ideas until an undreamed of perfection was reached. The youngest and favorite son of Jonathan Whipple was a deaf-mute, and the father's natural desire to assuage his affliction resulted in his acquisition of a limited but intelligible form of speech. Incidentally this unusual father discovered that a more ready understanding was possible when his own face was under close scrutiny. Thus he gained remotely enough the first principles of lip-reading, and after long and patient effort he succeeded in teaching his son the art of

understanding through the eye. This sturdy, unpretending New England farmer, whose entire horizon was included within his small and rocky farm, and whose sole interest had centered in the simple religious faith of the sect to which he belonged, achieved a degree of success in the oral education of his son which other instructors well might have envied. Other isolated efforts were then being made with the same great object of improving the method of instructing the deaf. But of these Mr. Whipple knew nothing. Wholly unaided by precedent or device, it was by dint of his own persevering efforts, and indomitable will that so wonderful a result was attained, and the son who had become an expert lip-reader and a fluent conversationalist was a living monument to the energy of the father.

Conscious of the helpless condition of the afflicted class, a compassionate desire possessed this embryo philanthropist to extend the benefits of his discoveries to a wider scope. Unfortunately prejudice was too strongly arrayed against so radical a change, and each successive effort was thwarted by unreasoning disbelief and opposition to an extent which this modest, retiring benefactor found impossible to surmount.

Despairing at length of his own ability to carry out the laudable plans in which his entire family had earnestly concurred, he at length confided his ambitions to a young and gifted grandson, who accepted this as his life work.

The alert brain and compassionate sympathy of Zerah Whipple were thoroughly aroused, and he was consecrated to the performance of what he devoutly believed to be his mission.

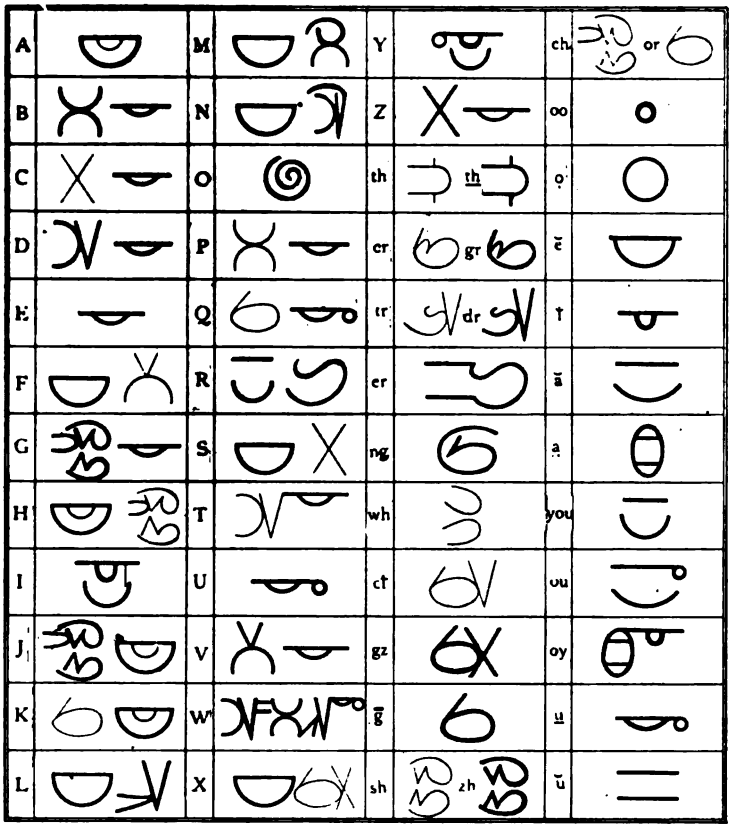
The methods of his grandfather were primitive in the extreme, and this defect he readily comprehended, after having secured a few pupils as a great concession. His first attempts with his scholars partook largely of the nature of an experiment, and he quickly felt the lack of organized system. Finally in sheer desperation he resolved to undertake a course of instruction at the Connecticut State Normal School, acting upon the theory which had suggested itself, that a study of the details of teaching might aid him in perfecting a system of his own. Instead of pursuing the conventional plan of visiting other institutions for the deaf he seems to have adhered to the belief in this instance which characterized his later labors, that of teaching the deaf child as far as possible in the same way that the earlier steps with the hearing pupils are taken. Be this as it may, the wisdom of his decision in

devoting himself to a period of study became quickly apparent, and in a very short time he conceived an idea of a system of symbols whereby the formation of sounds could be illustrated simply and lucidly. This was the longed for inspiration, and hastening home Mr. Whipple began its development.

Week after week of concentrated mental effort ensued, and as a direct result of his labors the "Natural Alphabet" assumed practical and definite form. The idea which it embodies is simply this: the visible vocal organs in a condensed representation are pictorially depicted, each in the proper position for forming sound, and Mr. Whipple believed that the process of familiarizing these positions would convey to the pupil the idea of proper articulation and the key to lip-reading at one and the same time.

In the simplest possible manner Mr. Whipple endeavored to depict the positions taken by the visible organs, the teeth, lips, tongue and palate. With the exception of the last these organs are visible to the eye, and they are thus very easily illustrated without recourse to arbitrary signs or characters which could not be instantly explained and pointed out in process of formation. The underlying principle is the utmost simplicity of the idea. A physiological chart

was introduced in the early explanations of the alphabet and the pictured teeth, lips, tongue and palate were reproduced on a minute scale corresponding to the symbols. The characters of the alphabet show in reality the positions assumed by the organs of the mouth,—thus the symbol for *f* shows the upper teeth resting upon the lower lip: that showing *th*, illustrates the tip of the tongue thrust between the upper and lower teeth, and the lips, pressed together in each instance,—and so on, to the end of the list. The process of illustration obviated the necessity of teaching the pupils the relationship



between the symbols and the art of vocalization, an element of simplicity not possessed by other systems. Adequately comprehended, the process familiarizes the vocal organs with the function of placing themselves properly and also furnishes a possibility of a correct conception of the principles of pronunciation, and indirectly, of those of lip-reading. No attention was paid to the internal organism of the throat, and Mr. Whipple conveyed the entire idea of sound and its formation through the vibrations felt upon the hand of the pupil when placed upon the throat and nose, or held before the mouth to denote the exhalation of breath. The system was stripped of every vestige of technicality, and only the facts absolutely necessary to a clear and concise understanding of articulation remained. As a boon to the adult deaf it would seem to be of inestimable value, and its utility has already been unmistakably felt.

Concerning Mr. Whipple's system of instruction, and methods of teaching, I am fain to confess my inability to furnish at present

an adequate synopsis, a defect, however, which I shall in the future attempt to remedy. In point of fact, however, it may be said that for some years no authoritatively recognized plan existed. The methods suggested themselves naturally in the course of a wider knowledge of the resources and possibilities embodied in the Natural Alphabet. Mr. Whipple was absorbed in the perfection and further simplification of the symbols, and the constant demand upon his time left but little leisure for an elaboration of the details of teaching. The school was at no time a large one, and the pupils were members of a happy circle, united as a common family, and receiving individual attention rather than by classes. Work and play were artfully commingled, and every possible opportunity was utilized for interpolating object lessons in which the name of the article or condition under immediate notice was taught and correctly comprehended. No better comparison than that of the method pursued by Dr. Bell in his demonstration with the younger children a day or two ago, can be suggested.

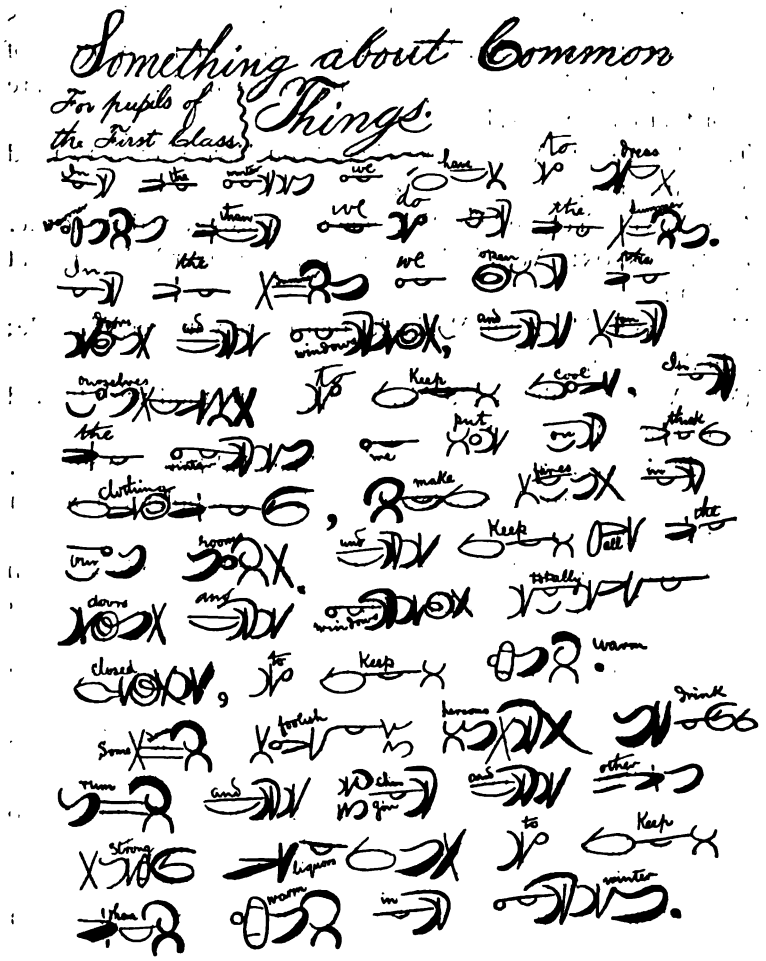
Mr. Whipple played among his young pupils and encouraged them by his interest, to express themselves orally, every effort tending to the accomplishment of that end.

With more advanced pupils, and in the case of the older ones who had already acquired a knowledge of the relationship of words and letters in the sign institutions, extensive drills were introduced, which consisted in writing in Natural Alphabet characters long lists of words, and translating these into writing with a view of correcting pronunciation,-*vice versa*. Printed articles* well-known poems and even Scriptural passages were translated to the Natural Alphabet form, and in each case every word was required to be pronounced orally before the lesson was laid aside, and thus a definite idea of the proper pronunciation was gained. This exercise proved especially adaptable to the cases of the class of pupils already referred to as having received previous instruction in the Manual Alphabet. Their vocal organs were familiarized with the duty of placing themselves properly through a study of the combinations shown by the symbols, and the art of speech-reading easily followed the art of speaking itself.

To a careful observer the invention of Mr. Whipple speaks for itself, and it is indeed but tardy justice which at last brings the achievement of Mr. Whipple into some degree of prominence among the records of other efforts in the direction of the oral education of the deaf. The efforts of the gifted young inventor were never

* See next page.

relaxed, and in the endeavor to still further adapt his ideas to the requirements of the deaf, every energy was absorbed. His untimely death, which occurred when he was barely thirty years of age, deprived the cause of one of its most earnest laborers, and the deaf of a devoted, unselfish benefactor and friend. He believed that his mission was divinely allotted to him to perform, and in a letter to my father, written during my stay at the school, he writes earnestly, "I am thankful, my dear sir, that I have been one of those selected by the Father to accomplish a work so full of blessed results." Undaunted by adversity, upheld by an unfaltering faith and a serene confidence in the beneficent results he labored to accomplish, he nevertheless succumbed to a short and fatal illness, to which his over-strained vitality fell an easy prey.



While he has never yet been appreciated for the full value of his labors, a future generation of the deaf may yet rise up to bless both him and the product of his fertile brain, which is an instrument to be utilized to the advantage of the class of unfortunates to whom Mr. Whipple's life was devoted. May it prove even greater and more powerful than even the most unselfish imagination of its inventor can ever have painted in glowing colors, and that others may have equally as great cause for thankfulness as myself is perhaps not too great a desideratum to be realized.

[NOTE.—The charts to which I have pleasure in referring illustratively are the work of Mr. Whipple's own hands, and were presented to me for use in home instruction when I left the school. This will impart an added interest, especially as this illustrates the elementary steps in the Natural Alphabet drills. The other exercises I have shown are partly Mr. Whipple's work and partly those of his pupils. All are interesting specimens of his methods, and are given for that reason only.]

THE PRESIDENT: Were these charts you have shown us used in your instruction?

MISS WAY: Yes, and Mr. Whipple afterwards gave them to me.

PROF. GORDON: Was it the older or the younger Whipple that taught you?

MISS WAY: Mr. Zerah Whipple, that is the younger Whipple; he made these charts.

(Miss Way here illustrated Mr. Whipple's method with the aid of a set of charts.)

THE PRESIDENT: I am sure we would be glad to hear from Mrs. Way an account of Mr. Whipple's method, as a supplement to her daughter's paper.

MRS. WAY: I hardly know what is required of me in addition to what has already been said. Mr. Whipple used the simplest forms that could possibly be adopted in his method of instruction. His first effort was to convince the deaf children that they had vocal organs which they could use as well as the hearing child; and it was a matter of the greatest effort and practice before he could make them realize that they could imitate him in producing sound. When they did make the sound he wanted, he would go off into ecstasies over the achievement. He would commence by placing the hand of the pupil under his chin, and when he uttered a sound would call their attention to the vibration felt on the hand. Then

he would make the sound that is represented by the smallest aperture that can be made with the open lips, which represents *oo*, and after they made that first sound he would repeat it half a dozen times; he would then place that little character on the board and drill them until they thoroughly understood that this small character represented *oo*; and he would then combine this sound with others into words.

PROF. GORDON: Was that the first thing he taught?

MRS. WAY: That was the first thing I ever saw him teach. He would try to have them follow his example and imitate the positions assumed by his vocal organs. When after many fruitless efforts they made a sound, he would place the hand under the chin so that they could feel the vibration. When they recognized the sound and could repeat it, he would manifest his delight and have them try it over and over again; and as soon as he could convince them that they had made the same sound he had, he would write it and impress upon their minds that a character such as he made always represented that sound, as well as the shape of the lips in forming it. He taught them to reproduce by means of the characters the positions assumed by the visible organs of speech. It was astonishing how rapidly these things became established in their minds. The system was new, and I remained with my daughter during the school year she was there, I was very anxious then to take my daughter home with me at the end of the term, and Mr. Whipple proposed that he should give me what instruction I required while I was there and prepared this set of charts and presented them to us, so I could take them home to use in the subsequent instruction of my daughter; as in case I became puzzled, I could refer to the charts for correction. I lived then in Iowa. Mr. Whipple thought I could take my daughter home and superintend her instruction for perhaps two years and then return to his school. As his system advanced he doubtless made many improvements, but he had no printed form of his system. He was laboring under peculiarly embarrassing financial circumstances and on account of the expense incurred was unable to have them printed in a definite form. After this I do not know whether he ever made any changes or not in his system, as we had no occasion to send my daughter to his school again.

PROF. GORDON: At what age did she become deaf?

MRS. WAY: She became deaf at five ; after she had learned to speak and sing.

PROF. GORDON: Is the intonation she now has what Mr. Whipple gave her, or her recollection?

MRS. WAY: I am unable to say.

PROF. GORDON: Did she ever cease to talk?

MRS. WAY: She ceased to talk understandingly; but I understood by anticipating her wants, and constantly trying to keep her vocal organs in training.

THE PRESIDENT: In what schools has your daughter been?

MRS. WAY: She has never been in any except a graded school. I superintended her early education myself. We returned from Mr. Whipple's school in 1875, when she was in her ninth year. When she was a little more than thirteen she entered the graded schools for hearing children in the town where we lived, Creson, Iowa, I had given her so much individual instruction that she was quite in advance of the grade to which she would naturally have belonged in the public schools.

The Superintendent of Education was very anxious to have her enter the graded schools, but did not know exactly where to place her. He found she was in advance of the various grades in certain branches of study. She went through building after building of the grade departments in order to find her place. Finally she accompanied as a visitor an intimate friend who was older than herself, at the time having no idea of locating herself in that particular school. When the class was called to recite she was surprised to find them placing on the blackboard examples of the lesson I had given her the day before at home in decimal fractions. Through this she located herself and went through all the higher studies with the class, graduating with honor in 1884.

MR. BOOTH: How old was she when she went to Mr. Whipple?

MRS. WAY: She was just eight when we took here there, and she came from there in her ninth year.

THE PRESIDENT: How long did she remain in a hearing school?

MRS. WAY: About six years. She passed through four complete grades, entering the grammar grade and proceeding through each successive grade, including the full High School course. During this time her teachers found it unnecessary to devote to her additional time or a degree of attention different in any respect from that received by other pupils. In addition to the public school instruction, she completed a ten months' course at a business college in Milwaukee, Wis., thus among strangers being equally successful.

THE PRESIDENT: I was in Kansas City some time ago and I saw Miss Way in her office. I should like her to describe the features of her work in her office.

Miss Way here stated what her business was. She said she had been for six years engaged with the Lombard Investment Company of Kansas City, who employed upward of seventy clerks in their office. Their business is loaning money on farm mortgages. She stated that when she went there first her work was not very extensive; but now it has grown and no one else is allowed to handle certain portions of the work but herself. In transacting business with strangers she experiences no difficulty; in fact, very often they do not seem to be aware of the fact that she is totally deaf. All communications between her and the other clerks, as well as the general public, are carried on through the medium of speech and lip-reading.

THE PRESIDENT: It was very interesting to find people coming on business and using words you would not think a deaf person would understand; Miss Way and evidently understanding everything.

MRS. WAY: With all due respect to other systems I cannot but think a great deal is due to the simplicity of the Whipple system. We never found the least difficulty with it. I have not seen these charts for probably fifteen years, as I have never had a demand for them. I feel that all the credit of what has been accomplished in my daughter's case is due to the simple fundamental methods of Mr. Whipple.

DR. GILLETT: I regard this as one of the most beautiful tributes of gratitude to a deceased benefactor that I ever listened to.

THE PRESIDENT: Mr. Hitz, Superintendent of the Volta Bureau, would like to make a communication. As Germany is the home of oral speech, he wishes to draw your attention to some remarkable figures from the late German census, and has prepared a translation of some letters that were published in the Organ of German teachers of the deaf.

MR. HITZ: The Volta Bureau will always be glad to furnish any information within its power to give. The latest statistics from Europe, or rather from Germany, relative to the Schools for the Deaf

were asked for. In the Organ of the German teachers of the deaf, the following table appears:

SCHOOLS.	Total Schools.	Boarding Schools.	Day Schools.	Mixed.	Total Pupils.	Boys.	Girls.	Male Teachers.	Female Teachers.	Classes.
Prussia.....	47	6	33	8	4083	2336	1747	382	24	375
Bavaria.....	15	12	3	..	596	302	294	36	14	59
Wurtemburg....	8	5	2	1	352	161	191	27	10	40
Saxony.....	3	2	..	1	390	219	171	41	..	36
Hesse.....	2	..	2	..	115	69	46	14	..	12
Baden.....	3	3	..	..	124	119	95	23	1	20
Elsace-Loth'gen..	4	4	..	..	178	91	87	12	13	21
Remainder of States....	13	2	9	2	442	263	179	43	2	48
Total.....	95	34	49	12	6370	3560	2810	578	64	611

THE PRESIDENT: What is this taken from?

MR. HITZ: It is taken from the Organ of the German Institutions, a publication which corresponds to the American Annals of the Deaf in this country. It is a brief extract from the Almanac (of 1890) published annually in Germany for the teachers of the deaf.

Mr. Hitz then also read upon request a translation which he had made from the March Number (1891) of the "Organ" of letters from former pupils to Director Vatter of the Frankfort School.

(1) From N. N. aged 20 years.

"I look upon the ability to speak and the act of reading from the lips what others say, and so having intercourse with the hearing as highly fortunate and a great benefaction. Everyone understands me and I can understand anyone who will take pains to make himself understood and to have me understand him. All it needs is that people accustom themselves to my organs and speak quietly entire sentences. Of course, I have intercourse with many hearing and also with some deaf-mutes. Of what use would be to me the *gesture language*, as it is only comprehended by deaf-mutes." *Audible speech from the mouth is to us a great blessing and in contrast to the gesture a great advance.* The latter serves as a means of intercourse between the deaf; but the most important, the intercourse with *all mankind* is only possible by means of speech, and

by means of speech the deaf occupy a much more desirable position in society than formerly.

"I have business and social intercourse with different people, who like to converse with me, and frequently when strangers have joined us I have been taken to be a foreigner whose vernacular was some foreign language. As already stated I have had little or no occasion to have intercourse with the deaf and have therefore almost entirely forgotten gestures, something I do not in the least regret. I have attained greater expertness in speech by taking pains to make myself understood and have others understand me. As I read many newspapers and instructive books, and also frequently consult the Encyclopedia in order to familiarize myself with strange words, I have in this direction since leaving the Institution improved. I frequently attend the theatre, if possible always first reading the text of the play and so not only understand all but enjoy it and do not pay out my money for nothing. I can only reiterate how fortunate I consider myself, and all deaf who by means of speech are now afforded the possibility of communicating with the world around us, and not only with ourselves."

(2) Letter from a former pupil now aged 23 years:

* * * "I find the more fluently I attain speech the less I miss the use of gestures, and I often wonder how it is possible that I ever used them. I can only account for the fact that the acquisition by us deaf of speech, takes long, hard and serious labor ; and in our youthful indifference we resort to gestures as a means of rest and momentarily indulging greater delight. None of us as children thought of exerting ourselves to the utmost to overcome the difficulties of audible speech and so attain earlier the desired aim of acquiring the language of the hearing, which we are capable of doing equally as well as the language of gestures. * * * The inability on the part of some of the deaf to entirely dispense with gestures no doubt may be ascribed to the lack of individual aptitude and temper. Now that I have entirely dropped the use of gestures, it moves me with pitiable sympathy to observe deaf-mutes who yet in their intercourse with others, make use of gestures."

(3) Letter from a former pupil, now aged 30 years.

"Since leaving the Institution fifteen years ago I have had very little intercourse with the deaf. I have been getting along comparatively well among the hearing with my speech. During the past ten years I have annually made journeys all alone in various parts

of the country without guides of any kind. I have gotten along with people, better or worse, by word of mouth. I have had occasion to have intercourse with the police, municipal officers and others, without these officials ever noticing that I was deaf. My keen eyes had no doubt much to do with the readiness with which I could understand what these people had to say, and it being along the borders where I mostly traveled, any indistinctness of speech on my part was ascribed to my being a foreigner.

"On the whole I found that I could understand the people better when they were not told that I was deaf, as they then spoke more natural and quickly; whereas otherwise they would so distort their words and make such grimaces as to render it impossible to comprehend what they said.

"In my opinion it is best not to introduce gesture language in the course of instruction, as it comes into use of its own accord; at times among the deaf, or by the hearing, gestures might prove helpful to speech; especially in words distinguishable from one another by a single sound only, and this frequently produced by the tongue unseen in the mouth, as for instance, brot,—bot, or hahn,—kahn, etc. During instruction, however, I would insist on strict exclusion of the gesture language and require pupils to practice reading from the lips the most difficult sounds and words. If this be strictly adhered to in the class room I see no danger to pupils being allowed out of school to use their hands in gesturing. On the whole I find I am readily understood, only when there is much noise and I try to increase the volume of sound I sometimes find my voice forsakes me entirely. I teach drawing and painting. My pupils understand me quite well, and on their part having to ask me but few questions, we get along nicely with one another."

In regard to Schools for the Deaf, Mr. Hitz then read the following translation of an extract from the Journal of the Royal Prussian Statistical Bureau for 1883, page 217.

"Taking into special consideration the Deaf-Mute Institutions, we observe in later years a change taking place in their character, that is, Boarding Schools are changing more and more into Day Schools.

The reasons which underlie this change are ascribed by experts to the following causes:

1. The Day School affords to the pupils the beneficial change between school and home and thereby increases through intercourse with the world, his power of observation.

2. Pupils can receive more individual attention than is possible in the Boarding School.

3. The intercourse of pupils with different people promotes more especially lip-reading and also in general speech, whereas the latter out of school hours is in danger of being dropped in the Boarding School and supplemented by gestures.

4. Epidemics, which on divers occasions have been the means of greatly crippling the school work of the Boarding School, cannot so detrimentally affect the Day Schools.

5. The conditions which in general the Day School presents are more in harmony with those of the parental homes and are therefore more agreeable to the child's feelings, because in the Day School the spirit and order of family life are, as it were, continued to the child at school.

6. The responsible labor of domestic training and home instruction at the Boarding School falls to the lot of the teachers principally, who in consequence thereof prematurely succumb, whereas the Day School divides these labors and cares and gives better promise of success."

PROF. GORDON: Who is the author of this line of reasoning?

MR. HITZ: This is a publication of the German Census, an official publication.

On investigation it was found that Dr. Albert Gutzmann was the author, a teacher at the university connected with the Royal Statistical Bureau.

DR. GILLETT: Referring to the figures given above I do not think that the facts existing in Germany would justify changes here. The boarding schools in Germany must be very poor ones, judging from these figures, while in America they are by far the best we have.

THE PRESIDENT: There is another point to this table. It is that the male teachers are greatly in predominance.

The meeting then adjourned until 2:30 P. M.

HARMONICS OF THE VOICE.

THURSDAY, JULY 9, 1891.—2.30 P. M.

THE PRESIDENT: I will call upon Miss Yale to give the afternoon's programme.

MISS YALE: I believe the present half hour is allotted to Mr. Paul Binner.

MR. PAUL BINNER: I propose to explain to you, ladies and gentlemen, the system of articulation employed in the Milwaukee Day-School for the Deaf, and taught to the Normal Students of the Wisconsin Phonological Institute in the annual course.

When we speak the vowels u̇ (rule), and ĭ (ship), the u̇ has a deeper tone, is lower in the scale, than the ĭ; and when we pronounce the vowels in the following succession: u̇, ō, ä, ā, ē, the tone rises gradually. Soprano singers can sing their highest note with an ē, but trying the same note with the vowel u̇ they will fail in gaining the upper limit of their voice. This fact gave rise to the theory that the principal difference in the vowels was due to the relative height of the tone, in other words, that it was dependent solely upon the number of vibrations in the vocal cords. Even Van Kempelen in his first attempts (1768–1791), to produce vowels on his speaking machine was misled by this idea; but he soon became convinced of the contrary. "Each one of the organ pipes," says he, "great or small, gave the vowel sound ä, the only modification consisting in higher or lower musical notes according to the size of the pipe; but it always remained the vowel ä." Later he succeeded in producing, to some extent at least, a number of vowels, by adding a funnel-shaped apparatus to the top of the pipe and closing the opening of the funnel in various degrees with the hand, thereby changing the form of the funnel. Kratzenstein, engaged in the same investigations, succeeded in producing the vowels by constructing a reed instrument with tubes of various form and size. His experiment was the practical solution of the problem; the

discovery of the theory underlying this problem fell to the lot of Robert Willis. He found that the mainspring of a watch or clock, one end of which was brought in contact with a revolving cog-wheel, gave at a certain length the vowel sound ä. By shortening the spring ā and ē resulted. Lengthening the spring more than in ä produced ō and u̱. The velocity with which the cog-wheel revolved changed the pitch of the tone, but did not change the vowel. Now let us see what took place in this action. Every time the spring was released from a cog an impulse was transmitted to the air and conveyed to the ear. Willis calls these impulses *primary*, and he found that the pitch of the tone was dependent upon the rapidity with which the primary impulses succeeded each other. With the increased velocity of the wheel the tones will rise higher in the scale. If the wheel is turned more slowly the tones descend in the scale. But when the spring has slipped from the cog it does not immediately become stationary, but continues to vibrate. These vibrations are termed *secondary* impulses. These secondary pulses follow in more rapid succession when the spring is shortened, and are slower when the spring is lengthened. If we now touch the vibrating spring with the thumb nail and for a moment destroy its equilibrium, causing it to swing back, we hear the individual or true tone of the spring, which in one and the same spring will be higher in the scale the shorter the spring is, and, of course, lower, the longer the spring is. In turning the wheel this individual tone is evidently repeated as often as the spring is released from a cog, and it is this tone of the spring upon which, according to Willis, the character of the vowel sound depends. A certain length of the spring and consequent height of the tone gives ē, and by a gradual lengthening of the spring and lowering of the tone we produce in this manner successively ā, ä, ō and u̱.

In speaking and singing, the vowels are produced in a similar way, that is, by lengthening and shortening, and by other modifications of our vocal tube. Analogous to the tube of the human instrument of voice was the experiment of Willis's with a reed-organ pipe which he provided with a flexible and movable tube, which could be shortened and lengthened, and by means of which he formed the vowels ē, ā, ä, ō, u̱. As in the former experiment with the mainspring the primary impulse represented a musical tone, so here, by a single impulse of the metal reed in the organ-pipe, a musical note was produced, and these air pulses or vibrations being reflected back and forth longitudinally in the pipe, the secondary impulses were formed.

As in the mainspring the pitch of the tone and also the vowel sound depended upon the length of the spring, so here it was dependent upon the length of the pipe, for this decides the rapidity with which the secondary impulses can succeed one another. The longer the pipe the less rapidly will these pulses follow one another, and *vice versa*. By means of this theory we can explain the fact that in the high notes of a soprano no u̇ sound can be produced, for the period of the primary pulses for this sound is too short compared with the period of time taken up for the secondary pulses. The vibrations or pulses of the vocal cords necessary for the high tone are too rapid, too short, compared with the length of the tube, which in the u̇ is at its greatest length. It is just as impossible to sing or speak ē with our organs in position for u̇, as to produce u̇ with the mouth formed for ē.

We now have to consider another important feature of sound before we can understand the practical value of these various experiments.

Sound is divided into two classes, simple and compound. A simple sound consists of one tone only, and is produced by a single atmospheric wave or pulse, or by a number of single waves following each other. The crack of a whip, whistling with the mouth, the sound produced by a flue organ-pipe, the chirp of a grasshopper, the sound of the tuning-fork, etc., are simple sounds.

The compound sound consists of a number of sound waves in motion, each wave uniting with two or more sound waves of different quality. Sound waves resemble water waves caused by a stone being thrown into a quiet pool. The little wave circles which are thus formed enlarge more and more the farther they advance from the place where the stone disturbed the surface. But a sound wave is not limited to a circle, but moves out in the form of a sphere. Another illustration will serve to explain compound sounds. The string of a piano does not vibrate in a pendulum-like manner, that is, not only sidewise, or up and down, but in every direction; and the string does not swing as a whole only, but also in parts or segments. These manifold swingings produce overtones, that means a number of tones beside the lowest or fundamental tone. These overtones or harmonics give the fundamental tone its *clangtint*, its characteristic sound. For instance, the note G is G no matter by which instrument it is produced, whether it be a violin, an organ, or a flute, because the number of vibrations forming the fundamental tone are the same in each instrument; but the difference of tone

arises from the fact that in each instrument the number and force of the overtones varies, and it is this diversity of the overtones which our ear recognizes as the characteristic sounds of the different instruments.

We can analyze compound sounds. We can cause this or the other of the overtones to be heard exclusive of the fundamental note or the other overtones. This is done by means of resonators, which consist of little hollow spheres made in various sizes according to the tone which they are to receive. A resonator being attuned to a certain note isolates that particular overtone, making it sound louder than the other overtones. A simple experiment, within the reach of everybody, will explain the foregoing and show the relation of a sound wave to a certain column of air. Take a bottle and a tuning-fork. Pour water into the bottle, gradually filling it up while holding the sounding-fork over the mouth of the bottle; at a certain height of the water the sound of the tuning-fork will be loud and clear. The air column in the bottle has been attuned to the sound waves of the tuning-fork in the same manner as the resonator of a certain size would receive a certain overtone of a com pound sound. We find that the column of air in the bottle has augmented the tone. This augmentation or reinforcement of sound is called resonance.

Upon these principles rest the results attained by Kratzenstein, van Kempelen, Willis, and Helmholtz; that is, that by supplying a tube or spherical form to a reed, or reed-organ-pipe, and thereby creating a resonator which augments one or another overtone, the character of the reed, the character of the original tone, is changed. This is exactly the same procedure which we perform every day in an unconscious manner when we, in speaking the vowels, cause our resonator, the cavity of the mouth, to change in form and dimension. The mouth and pharynx form the tube, which being flexible, movable in its parts, is readily adjusted and attuned to a certain overtone of our voice, thereby augmenting the overtone and changing the sound emitted by the vocal cords, so that it does not appear to us any more simply as tone or voice, but as a clearly defined vowel. This augmented overtone is called the characteristic tone of the vowel.

From the foregoing we deduce the following:—

That the different vowels do not depend upon a different pitch of the voice for each vowel, for we can speak all the vowels upon the same pitch, and yet each one will be heard in its normal purity;

nor do the vibrations of the vocal cords form the vowels, but the adjustment of the cavity of the mouth produces them, selecting and augmenting the overtone necessary for the formation of each vowel. When we change our mouth into a resonator for a low-pitched note we produce u̇, changing our resonator for a note of a little higher pitch we have ō, and changing our resonator to its smallest capacity, thus forming a resonator for the highest note, we form ē.

When we whisper the vowels we hear the characteristic tone of the vowel, its pitch. To each vowel we can then ascribe its position in the musical scale. Helmholtz analyzed the vowels, as sung, by means of resonators. We can experiment upon the resonance of the mouth by means of tuning-forks. Different tuning-forks will be found to be augmented in sound while the mouth is shaped for one or another vowel, the vibrating fork being held before the mouth. An A tuning-fork will form corresponding sound waves in a mouth formed for a correct ō, that is, it will sound loudest when placed before the ō mouth. I tried this experiment with a class of twenty-six students of a normal school, and but one mouth failed to respond to the vibrations of the tuning-fork, and this was caused by the person not being able to produce at once a correct ō mouth.

The experiments of Helmholtz and others prove what has already been said, that the vowels, according to their pitch, appear in the following succession: Beginning at the lowest pitch with u̇ we rise gradually in the scale as the ō, ä, ā, ē, are spoken. What do we learn from this? That we must adjust our mouth according to the fixed laws of acoustics. Let us once more recall the fact that a short tube is necessary for a high note and a long tube for a low note. We further know that we are able to make these necessary changes in our vocal tube. Is there more than one way of making these adjustments? Yes, there are two; but one only is the correct way. The majority of people bring about the lengthening and shortening of their vocal tube by means of the tongue, by elevating or depressing it. But only hearing people can make use of this manner of adjustment, for they are able to regulate the sounds by means of the ear. The deaf cannot do it, or at least, only imperfectly, because this mode of forming the vowels is for the most part invisible, they can obtain it from the lips of others only in a mutilated form and have no means of knowing when they are right, having no ear to guide them.

The right way of managing our vocal tube is by shortening and lengthening it. This action can be performed at both ends simultaneously, since, when we advance the lips, we are able at the same

time to lower the larynx. This tube adjustment is the correct one, demanded alike by the anatomy of the organs of speech and by the laws of acoustics. It produces the best results. We can have a good proof of this by attempting to say u̇ with the lips in position for ä or any other vowel but ū. We shall produce a grunt, but no round, full, musical u̇. It is an utter impossibility. Now, who use their tubes in the proper way? All good speakers, actors, and singers. There you see mobile lips. There voice, without being forced, travels through a large hall audible even in the farthest corner. Why is the Italian school of singing acknowledged to be the best? Because it teaches correct vocalization. Watch the mobile lips of a singer of the Italian school and compare him with any other. Not only is his pronunciation intelligible, but his voice excels in musical quality, because he forms his vowels correctly. Only what is best for the hearing is good enough for the deaf.

The following arrangement of the vowels is in accordance with the laws we have been investigating:

First position: ē ĭ, ĭ y̆, ĕ, ā e̤ â ê ă.

Second Position: ä å.

Third position: a̤ a̤, ŏ o ŭ ô, ō, u̇ o̤ o͞o, u̇ o̤ o͡o.

First and third positions: ū.

Second and first positions: ī ȳ.

Second and third positions: ow ou.

Third and first positions: oy oi.

The term First Position means small resonator, shortened tube. The lips for this position are slightly drawn backward, in the form of a smile. In speaking the vowels contained in the first position and second position, the corners of the lips remain in *statu quo*, but the vertical opening of the lips grows larger with each succeeding vowel sound. From ē to ä there are but five different vertical openings of the lips, though there are twelve different characters for the vowels. The first four letters require the same opening, ĕ a little larger, the next four are all of the same kind and the third increase in the vertical opening takes place, ă again enlarges it, and ä and å demand the largest vertical opening with lips in same position as in the first position; ä therefore, means largest vertical opening with corners of lips back. Speaking these vowel sounds in the reverse order, from ä to ē, we find that a gradatory shortening of our vocal tube takes place, and in this instance in such a manner that only the lower part of the tube, the larynx, engages in the action by rising higher and higher, reaching its highest point in the ē. Pronouncing the vowels from ē to ä it is obvious that a gradatory lengthening of

the tube is required. At the same time the tube undergoes another change, for, taking again the reverse order from ā to ē a gradatory diametrical widening take place, having its greatest dimensions in the ē. *Vice versa*, we can say that a gradatory narrowing of the tube accompanies the vowel formation from ē to ā.

The second position, which contains the vowels ä ȧ, might, perhaps, for simplicity's sake, have been classed with the first position. But there is a physiological as well as a practical reason for making a distinction. The physiological reason is, that in the ä a unique position of the organ exists, found in no other sound. In all sounds which are produced by a shortened tube in the direction from below upwards, the tongue-bone rises with the larynx, but in the ä the tongue-bone takes the same position which it has when at rest. The practical reason is, that the ä is needed in the analysis of the compound vowels ī and ow, and their proper classification would be impossible without it.

The third position comprises all vowel sounds which require a lengthened tube. The diametrical narrowing of the tube continues from vowel to vowel, reaching the smallest diameter and greatest length of the tube in the u̇.

The vowels ē, ā u̇, are the fundamental vowel sounds of the English, as well as of every other language. Between the ē and ā and the ā and u̇, we can place every other spoken or imaginable vowel sound, and therefore the vowels appear in the following physiological order, divided into two groups.

Shortest tube, but largest in diameter, smallest resonator.

ē—eve.
ī—machine.
ĭ—ill.
ў—nymph.

ā—pale.
ē—prey.
â—air.
ê—there.

} These are compound sounds owing to the ē vanish.

ĕ—met.

ă—man.

ä—father.
ȧ—ask.

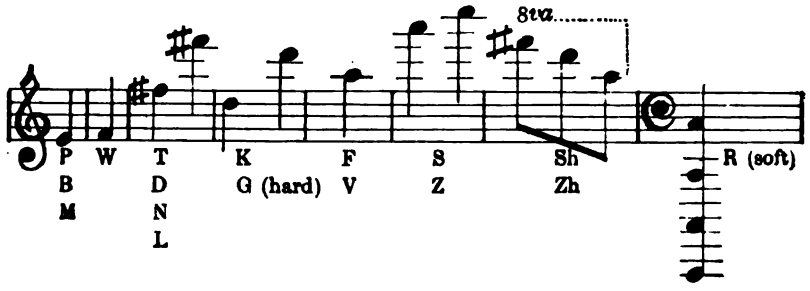
} First Group.

a—all. a—what.		
ŏ—odd. o—son. ŭ—		
ô—order.		
ō—old.	Compound sound, the ō vanishing into u.	Second Group.
u—rude. o—prove. ōō—moon.		
u—bull. o—bosom. ŏŏ—foot.		

Longest tube, smallest diameter largest resonator.

But not only the vowels can be assigned to a place in the musical scale. The consonants are also subject to such classification. Consonants are noises, they have no musical qualities. But by means of resonators, noises of every kind can be classified. The pattering of the rain-drops on the roof, and the noise of great cities, all the rattling, thundering and humming of wheels, of machinery, the patter of human feet and the hum of human voices, all these can be assigned their proper pitch. Experiments have proved that different cities at different hours of the day or night have their specific roar or noise, which, while at high noon it may represent the pitch of C, sinks down at midnight to a murmuring F. Each city has its own peculiar note represented by the noises at the various times of day or night.

Dr. Oscar Wolf in his acoustic physiological work entitled "Speech and Hearing" (Sprache und Ohr), has shown the relative pitch of the consonants. The air enclosed in the mouth when in position for the formation of a consonant is always attuned to some note in the musical scale. The mouth forms the resonator for one



or the other musical note. According to Dr. Wolf's experiments, which were made by the aid of the best acoustic instruments, the various consonants are shown to have the following pitch. Where two notes are given for one consonant it means that the consonantal noise has this limit within which it may be heard:

(The letters m, n, l, and w, have been added by me).

Upon first examination it may appear improper to place the mediae upon the same pitch with the tenues because the former seem to have a lower pitch; but upon closer investigation we will find that it is the sound of the voice accompanying the mediæ in the English language which causes these sounds to seem lower, but the consonant proper, for instance, the explosion which forms the b or d, remains the same and is independent of the murmur which goes before. The sh constitutes a chord of three notes, and is therefore the most musical of the consonants. Another interesting fact connected with Dr. Wolf's investigation was the discovery of the four notes which were distinctly heard to be contained in the r. The lower c is the fundamental note, and the three other notes represent overtones, of which the two lower notes sounded but faintly, while the fundamental and the upper note sounded equally strong. It would lead us too far to explain the reasons for these peculiarities of the sh and soft r. Suffice it here to say that the laws of acoustics plainly show the reasons for these phenomena; for our purposes we are interested to know of what practical value these investigations are to us and to our work. The answer is: they teach us that in order to pronounce the consonants correctly we must conform to the physiological laws upon which their production is based. We see that consonantal noises represent tones of high and of low pitch, the same as the vowels. In the vowel scale we found that ē is the highest and u̇ the lowest note. Among the consonantal noises s has the highest, and b the lowest pitch. The r being a laryngeal sound is classed separately. We further noticed that, in order to produce correct vocalization, we must change our vocal tube according to the overtone which belongs to a certain vowel, and if we want to obtain a correct pronunciation of the consonants we must adjust our mouth according to the character of the elements they represent, our resonator must be attuned to the pitch which each consonant represents in the musical scale. We can not form an s or t with the lips pushed forward, any more than we can give an u̇ with lips in first or ē position, or *vice versa;* nor are we able to produce sh with lips in position for s. From all the foregoing we are led to

conclude that the consonants are subject to a similar classification as the vowels, and we find that they are all contained in the three positions, which we may also call the ē ä and u̇ positions respectively.

Their classification is as follows:

First position: ş ç z s; t, d, th, t̄h; k, c , q, ḡ; n; l; r; x; f, ph, v; ng.

Second Position: p, b; m.

Third Position: sh, zh; w, wh.

First and Third positions: ch, j ġ.

The r in the first position is the initial r. The soft r has not been classified because its position depends upon the vowel preceding it, and is therefore within the range of all three positions; for instance in *dear* it takes the first position, in *are* the second, in *or* the third. In the first position for the consonants the lips take precisely the same position as for the vowels in the first position. The second is the intermediate one between the first and third, and differs from the second vowel position only in this, that its consonants are more pliable than those in the other positions, and, therefore, according to the vowel preceding or succeeding them, they may partake a little of either one or the other position. For instance in the word *poor* the lips for p take a position akin to the third position, while in the word *peer* the form of the lips resembles more the first position.

Looking at the classification of the vowels and consonants according to the three positions, the simplicity of the arrangement becomes evident, proving also the simplicity of the laws governing our vocal organs and their productions. Each vowel and each consonant has its fixed place. The teacher has no need of experimenting and of searching here and there. It also simplifies the work for the pupil and makes the task easier; for he is not led hither and thither, but told at once what to do in order to use his organs correctly and for a specific purpose. In lip-reading, the normal position of the lips, as taught in the three positions, provides not only a scientific, but a practical basis for the pupil. Even the careless speech of a hearing person necessarily must make use of these positions more or less, while careful speakers and those who wish to take special pains to be understood by a deaf person use their lips in conformity with the three positions, because in attempting to form the elements correctly they employ a normal action of the organs of speech.

It will hardly be necessary to remark that to understand the three positions is not enough for a teacher. The study of the

anatomy of the organs of speech must precede the study of the elements of speech, and in this study every element is to be analyzed and the laws which govern each production thoroughly understood. The object of this paper is to give but a resume of the system employed in the Milwaukee Oral School for the Deaf and taught to the normal students of the Wisconsin Phonological Institute.

The other principal feature of this system is the mode of breathing. The anatomy of the human body teaches us that abdominal breathing is the only correct breathing. There is also but one correct way of inhaling, and that is through the nostrils, and through the nostrils only. This can not be emphasized too much. When inhaling thus we again find the ē or first position of value to us. For with lips in this position we are able to take in a greater quantity of breath, and in an easier and more imperceptible manner, than by any other procedure. But this mode of breathing must be acquired. Proper breathing is one of the great secrets of life. Let any one who thinks he is in the habit of breathing properly place his lips in the position before indicated and for a space of five minutes devote all his attention to the subject of breathing through the nostrils only, and he will be surprised to find that he is making a discovery which verifies all I have said in regard to this manner of inhaling. Breathing in this manner while using speech, as well as for the general purpose of sustaining life, carries with it the most salutary effects. In regard to voice let us notice here that it assists the pupil in obtaining a natural voice and in acquiring continuity of speech. Owing to our limited time I refrain from pointing out all the advantages derived from normal breathing, but one must necessarily be mentioned, for it is a potent factor in the production of good articulation and an integral part of this system. I refer to the quiet position of the tongue which is caused by breathing through the nostrils. No one knows better what an unruly member the tongue is than the teacher of articulation. How that bundle of muscle fibres twists about, rises up, seeks to hide in the lower jaw or with snake-like motion vanishes towards the pharynx. Of course our pupils are not to blame when we set them the example, and even create unnecessary tongue manipulations, which no hearing person, who is not a teacher of the deaf, employs. Normal breathing keeps the tongue down and tends to keep it in front, where it belongs, firmly pressed against the lower teeth. Observe, I call it normal breathing, and in lieu of numerous convincing arguments I shall refer to just one, which I think you will accept as authority; I mean the narrative of

the creation of man according to Genesis, where we are taught that God breathed the breath of life *into man's nostrils,* and He certainly meant that this breath of life should continue to enter there for all time to come, and not seek a new channel by way of the mouth.

Breathing exercises and vocal gymnastics adapted to this system of teaching articulation are employed daily in the Milwaukee school. Time will not permit me to explain them here; but I shall be glad to furnish gratuitously to those desiring it a copy of the charts with full explanation of the exercises, the reasons for them, and the results which they are to bring about.

The system which is here brought to your kind attention is the result of years of study and practice, inspired by a desire to systematize the teaching of the elements of speech and thus to lighten the difficult work of the teacher by creating a firm and ever reliable basis upon which the structure of speech for the deaf can be raised by unerring hand, well trained and skilled for the work.

If I have not been able to show the wonderful simplicity of this system (for all laws of nature are grand in their simplicity,) you must ascribe it to my inability to condense an entire system into the space of one lecture. If I have been able to present to you an intelligible exposition of some of the main principles governing this system I shall be highly gratified.

THE PRESIDENT: Our time is so far advanced that I think the Association will bear me out in suspending the remainder of the programme for the present, in order to afford those representatives of schools who have not already spoken, an opportunity of occupying a few minutes in telling us something of articulation work in their schools. I think you will all agree with me that we shall be delighted to have an opportunity of hearing from Mr. Roe, principal of the Midland Institution, in Derbyshire, England, who has favored us with his presence here.

MR. ROE: Mr. President, Ladies and Gentlemen—My wife and I have been exceedingly pleased to attend this convention; we have also been very much gratified with the kind manner in which we have been received by every member of this Association. Englishmen are said to be cold-hearted. This is not the case anyway with Americans. I was somewhat amused the other day in the dining-hall. One of the waitresses very politely told us we were foreigners or looked like foreigners. I don't know how we look, but we feel that when we are in this room, we are amongst brothers and

sisters. We have been delighted at what we have seen and heard; and even if the Association is going to end with this one single convention, a great and good work will have been accomplished for the deaf children of the United States; even if your work were to end to-morrow.

We have gained a number of ideas in this room during the last three days, and some of the ideas which we have gained will be carried into practical effect in my school, immediately on my return home. The day before we left England, one of our most distinguished oral teachers in London, I refer to Mr. John Tyme, a man highly respected for the honest and hard work he is doing for deaf children, wrote a letter to me, something to this effect: "Delighted to hear you are going over. Don't be carried away with that confusing combined system which the Americans use." Now, sir, my own impression is that the very best teachers of the oral system are combined teachers. Bear in mind that the combined system is the half way house to oral teaching.

For the past two years my school has been conducted entirely on the oral method. I confess with all humility, after seeing and hearing what has been done on this platform, that I am very much humbled indeed. I must confess that I cannot bring my children anywhere near the standard I have seen produced by American teachers; but I am not at all jealous, and even if these efforts could be surpassed anywhere else, I should be glad to go to that country and find teachers and children that can surpass the English.

We are willing and anxious to learn from any country any information. The oral system in England is in my opinion making steady progress year by year. It may be slow, Englishmen always are slow; that is to say slow and sure; the perfect way to ultimate success.

Now my school, in which there are 60 children, as I have already said, is being conducted entirely on the oral system. We are at a great disadvantage compared with American schools. In the first place all our boys are expected to leave school at the age of fourteen or fifteen, and you will readily understand that is a great difficulty in our way, especially when, as frequently occurs, we don't get hold of the boy until he is ten or twelve years old. Nevertheless, we are trying to do our duty to these children in the limited time placed at our disposal. I have been asked concerning our day schools in England, and these differ very widely from the so-called day schools in Germany. In England in the day schools

the pupils come from their own homes and attend class perhaps from 9 till 12 and 2 till 4. The teacher has no further control over these children. Now in a very large majority of the day schools in Germany, and I have the authority of a German teacher in making these remarks, the children go to the school during the day time, and then go to lodging houses near by the school; so that it is hardly correct to say there are so large a number of day schools in Germany as would appear by the figures shown us by Mr. Hitz. Of course, after all, they are small boarding institutions, and in my opinion this is a disadvantage to the children.

What I want to point out is this that in boarding institutions the master or matron has full control over the children out of school hours. In those day schools where they are boarded out, as is the case in some instances in England and frequently in Germany, the authorities of the schools have no control whatever over their children out of school hours, and consequently they may fall into many habits of which every good teacher will disapprove.

With regard to our day schools in England, you may wish to know as to whether they are a success or not. In my opinion they are not. I may say that a while ago I was in a day school in which there were ten children and I asked the teacher, a most excellent lady in every way, how many years the children had been at school. Well, the time varied from twelve months to five years. I asked if she did not find it very difficult to teach where children came in every year. She said: "Oh, yes; it is practically for ten children, ten classes." It is a most difficult thing indeed to teach a class of ten children that come in on ten different occasions, spreading over some six years.

I will also say that the interest taken in the education of the deaf in England is nothing like what it is in the United States. I believe it was Professor Gordon who spoke to me last night and congratulated me that the Bill for the Education of the Deaf of Great Britain had passed the House of Lords a week or so ago. Well, we are very slow in England. This Bill passed the House of Lords a year ago, and passed the House of Lords again ; and it has got to pass the House of Commons; and I should not be surprised if it takes seven years to pass the House of Commons. The worst of all is, that in this Bill for the Education of the Deaf in England, there is nothing to benefit either deaf children or the teachers of the deaf ; that is my opinion of the bill. For instance, in some cases a little deaf child getting instruction in my institution would bring in $100

a year. But we have to take sometimes three and four children out of a family, in which we could not get that help. What do we do? We have to beg money. In my case I have had to beg some $50,000 in the last ten years or so; and we have had over 500 public meetings in order to get money to maintain the institution, and to raise funds for the erection of new buildings.

I may say that immediately on my return to England we are going to erect a new building, the plans of which are already prepared. This building will take in at least 120 children, double the number we have now. Let me say in conclusion that if any of the brothers and sisters of this Association and of our profession ever visit England, we shall be very glad to give them a cordial and hearty welcome, and show them something of our work.

THE PRESIDENT: In this country the teachers and friends of the deaf recognize no political distinction between Americans on this and those on the other side of the border line, and I am sure we would be glad if Miss Mathison, of the Ontario Institution for the Deaf and Dumb at Belleville, Ontario, Canada, would give us a few particulars with regard to the articulation work that is being done on the other side of the line.

MISS MATHISON: At present we have forty-five pupils in articulation. We would like to have more pupils taught speech and would rather have them in oral classes, as in that case they would get more practice and not interfere so much with the manual classes; but I am afraid we will have to be satisfied for a while with our present numbers, I have enjoyed the Convention very much and have learned a good many things which I hope to be able to put in practice in the future.

MR. HUBBARD: I think we had better annex that institution to the United States.

THE PRESIDENT: We had expected to have had a representative from the Girls' Catholic School in Montreal, Father Trepanier, but unfortunately illness has prevented him from coming. We have had information from the following American schools, Pennsylvania Institution, Chicago Institution, Western New York Institution, Illinois Institution, Portland School for the Deaf, Albany Home School, American Asylum, Horace Mann School, Voice and Hearing School of Englewood, Ill., Pennsylvania Oral School, Scranton, and the National Deaf College of Kendall Green. There are a number of other institutions and schools represented here, and we should be very glad if any of the representatives would care to say a few

words. I will say that the Institution for Improved Instruction in New York has a worthy representative in Mr. Thompson, though we regret the unavoidable absence of Mr. Greenberger. Perhaps Mr. Caldwell of the Florida Institution would like to say a few words.

MR. CALDWELL: I don't know that I can say much about our work in articulation in Florida; but I may tell you why we don't do more. Some of you may know that it is a dual institution, we have deaf and blind both; and in addition to that division we have also white and colored; according to the law of the state they are required to be kept separate. In addition to all these sub-divisions, we have also a boy who is not only deaf, but is losing his sight, and he has to be taught by raised letters; so you see we have about six or eight divisions that don't exist in most schools for the deaf. Next year I hope to accomplish more, and I have every reason to suppose that we shall. We have attempted to teach articulation. In fact, there has been a good deal of work done in that direction during the past years. Last year we were short one teacher, and there was some doubt in my mind with regard to appropriation, so I could not make much effort. The Legislature now however has made ample provision for next year; and one reason for my coming here was to secure a teacher of articulation. Experienced assistants are in much demand in Florida. I will say that I have certainly learned a great deal at this convention and am glad to have the opportunity to express that.

THE PRESIDENT: The Rhode Island school for the deaf has a representative in the person of Miss Littlefield, but I don't know whether she now represents Rhode Island or Western Pennsylvania.

MISS LITTLEFIELD: I know very little about Rhode Island now, but would like to express my appreciation of the work done here, on behalf of Western Pennsylvania.

THE PRESIDENT: Shall we hear from the Ohio institution?

MISS ELIZABETH FAY: We have about four hundred pupils, one-third of whom are under instruction. We have had only two teachers the past year, but hope to have one more next year. If we had more teachers, more pupils would be under instruction. We have the sympathy of every one concerned and hope we shall do more work in the future. I certainly for my part shall try to have it so.

THE PRESIDENT: We would like to hear from the Arkansas Institution at Little Rock.

MISS S. H. DEVEREUX: Articulation is being taught in our school, but we have had only one teacher. It will receive more attention hereafter. We have one hundred and twenty-five scholars and the school is growing very rapidly. I think the principal will do all he can to introduce articulation more extensively.

THE PRESIDENT: The New Jersey Institution has to be heard from.

MRS. KEELER: Mr. Jenkins is desirous of having the oral work extended. I think the future of our school is very bright for articulation. Twenty-nine pupils were under instruction during the past year. At first the pupils seemed to have very little interest in articulation. After consultation with the Principal it was decided to form a "Speech Club" for the older pupils. They were to become members of the Speech Club if they would promise to try on every possible occasion to communicate with each other, and with the teachers and officers, by speech. and not use signs or the Manual Alphabet. In a short time much enthusiasm was aroused and a second Speech Club was formed for the younger pupils, under charge of Weston Jenkins, Jr. We made these social gatherings as attractive as possible to the children. The first hour and a half was devoted to speaking games, the pupils speaking and reading each other's lips. They also made great proficiency in "shadow reading." Then they were allowed to amuse themselves by dancing, playing dominoes, jackstraws and other games, followed by refreshments. Before school closed nearly every pupil desired to learn to speak and read the lips.

THE PRESIDENT: If there are any other schools represented here that I have omitted to allude to, we should be glad if representatives from those schools would favor us with a few words.

MR. WESTERVELT: I would like to say that Mrs. Mills wrote me very recently about her school at Shanghai in China. She says they have met with great success and their pupils are talking and writing a great many words, and were looked upon by their parents as having accomplished the miraculous. She says that they will now undoubtedly have applications for a very large number of children when they open school again in September. They have received applications for six more, but it costs about $100 a year so far to take care of these deaf children, and while Mrs. Mills has now on hand, I think, from four hundred to five hundred dollars she will

need about a thousand dollars to conduct the school during the next year. I would like to urge upon the friends of the deaf to do what they can for this school in China.

THE PRESIDENT: We will now hear Miss Leadbetter's paper on articulation as taught in primary schools; which will be read by Miss Fuller.

MISS FULLER: This paper was written by Miss Florence E. Leadbetter, teacher in charge of the primary classes in the Horace Mann School.

ARTICULTION TEACHING IN THE PRIMARY CLASSES OF THE HORACE MANN SCHOOLS.

READ BY MISS FULLER.

In giving speech to our little deaf children we try to follow as nearly as we may the way which nature, the great teacher, points out, and take the same steps which the mother does with her hearing babe. We know how many months pass before the "Ah! Ah!' "Papa! Papa!" of the fond mother receive any response, and how the months lengthen into years before the baby's talk is at all intelligible to a stranger. Ought we then be impatient if our little ones, with all the difficulties in their way? cannot say "How do you do?" at the end of six months, or read a primer within a year. Shall we not rather learn "to labor and to wait," content in the assurance of final success.

Our first endeavor is to bring to the consciousness of the children the sounds which they unwittingly make at play and in laughing and crying, allowing them to feel the vibration in the throats of others as well as in their own. Then we lead them to make voluntarily easy sounds, such as a hearing child first makes, like "Ah-ah-ah," "boo-boo-boo," "mŭ-mŭ-mŭ." These sounds can soon be developed into simple words, like arm, boot, mama, papa, etc. It often happens that a child who is too shy to speak alone will join with others who are gathered about the teacher for a class exercise. As soon as he is willing to try we begin with him the individual drill upon elements and their combinations which is thereafter to form a regular part of each day's work. With one forefinger upon the throat of his teacher and the other upon his own, he takes from her lips the pure vowel sounds, then the consonants; first as mere

interruptions of the voice—"äm, äv, äth, än," etc., second as initial "bä-bä-bä," "gä-gä-gä," etc., then as initial and final "mäm-mäv-mätch-män," etc., until a thorough drill has been given upon all the vowels and consonants. This is in fact the same drill which the children afterwards take from the "Drill Chart," prepared by Miss Fuller. We do not oblige them to wait for words until they have acquired the elements; we believe thoroughly in the "Word Method," and use it from the very first; but we carry on both together, because we believe that this elementary drill is the best possible preparation for lip-reading while it cultivates in the pupil attention and self-control. We think it wise to call as little attention as possible to the vocal organs, as we want natural, not mechanical speech. So we give only simple exercises for the development of the lungs, and the appreciation of vibration, high and low pitch, long and short sounds, etc.

The "Drill Chart" is the basis for the work in phonics in all the classes excepting the first. Constant practice in the rapid reading of the combinations gives fluency of speech, and helps the children to take up new words with confidence. They learn from this chart the diacritic marks and associate the various vowel and consonant sounds with the key-words as given in the other charts prepared by Miss Fuller. With these they are soon familiar and ready to give the key-word for the marked vowel or the proper quantity of the vowel in the word. The reading of columns of words containing the same vowel sound or beginning and ending with the same consonant is very helpful to the memory. For variety, nonsense lines like the following, please the children:

"That cat can catch fat rats."

"Big boys buy butter balls."

"Cross cats catch cute crows."

"Dear Dora dresses dainty dolls daily."

They also enjoy tests, in which each tries to write the largest number of words containing a given sound. It is an interesting, though pathetic sight, to see these children thinking sounds they have never heard. Another exercise in which the "Drill Chart" is useful is conducted in this way: The teacher points to the elements forming some word, the child sounding them as they are indicated, then writing the word. For instance, the teacher points to initial *t*, short *u* and *ng*; the child sounds and writes the resulting word, "tongue." This exercise can be readily adapted to the ability of the

class, as it is quite possible to make it simple enough for the little ones or sufficiently difficult for the most advanced.

We require sight-reading of all the classes, but the lowest, being careful to give only familiar language, that there need be no hesitation on the part of the pupil because the meaning is not clear. Reading-lessons in the form of dialogues or simple questions and answers give most pleasure and the best results with our pupils.

The axiom most prominent in the educational thought of the day is, "Children learn to do by doing." So our children, if they would speak and read well, must *speak*, SPEAK, SPEAK; *read*, READ, READ.

(*Adjourned until 10 o'clock the Friday morning.*)

ADDRESS BY DR. PHILIP G. GILLETT.

FRIDAY, JULY 10, 1891—10:00 A. M.

THE PRESIDENT: As Dr. Gillett has to take an early train, I will interrupt the proceedings this morning by asking him to make a few remarks.

DR. GILLETT: Mr. President, Ladies and Gentlemen, I had hardly expected to have the distinction of making the opening remarks this morning. I assure you I appreciate it, and am very thankful for the opportunity.

For thirty-nine years I have been present at every important gathering of teachers of the deaf except one, in 1878, when I was absent seeking the restoration of health in Europe. Among all these I regard this as one of the most important, one of the most interesting, and one marking most distinctly an era in the work in which we are engaged. I have seen no convention that was marked by a more just appreciation of the spirit of mutual concession and fraternity than has prevailed here with regard to the methods of instructing the deaf. I think we stand upon the principle of proving all things and holding fast to that which is good.

We are in the infancy of work among the deaf. Fifty-seven and a half centuries elapsed before any successful efforts were instituted to teach the deaf, and it is not at all to be wondered at that the progress we have made has not been greater. Our mental constitution is such that we receive our impressions from our surroundings, and it is very difficult often to give up the notions that we have imbibed from those whom we regard as venerated fathers. They were venerated fathers, and but for them we should not have been here to-day, but because our fathers have achieved so much it is not for the remaining generations to say there is nothing further to be done.

It is well for us to bear in mind continually this spirit of mutual respect and concession for one another. I am reminded just

here of the man who went out in the mist of the morning and saw an object that filled him with terror; upon approaching nearer he found it to be a man ; and upon close contact he found it to be his brother. We may at first have looked upon each other with some degree of distrust and suspicion but I am convinced that come from whence we may, believing in whatever method we may, the nearer we get together the more we find ourselves confiding in, trusting, and loving one another.

Ours is truly a great work ; it is a beautiful work whose successes are calculated to fill us with greatest satisfaction, but let us remember the fable of Narcissus at the fountain and beware that we become not enamored with ourselves to the exclusion of others who in their way are laboring with zeal and assiduity equal to ours.

Before going from this meeting I want to say that I am exceedingly thankful I have had what seemed to be the forbidden pleasure and happiness of being present at this convention. It will be one of the green spots in my life. I am still going on searching for something better. I am as much an inquirer now as at any time in my life. If any of you think I am talking as an old man I will speedily satisfy the youngest, if he will give me a fine team, and a three seated buck-board with five beautiful girls, I can ride as far as any of you.

As I was saying, I am as much an inquirer now as I ever was in my life. I hold to nothing, but my wife and children, which I would not give up for something better; I suppose more deaf have come under my hand than of any other man living or dead. I have had over two thousand deaf pupils and expect to have many more, but in the ordinary course of nature some of us cannot remain here very much longer; and when I and others of my associates present and absent have passed away, it will be left to those who are younger to take up the responsibility. You cannot shirk it if you would and you would not if you could; and one of the very pleasing, gratifying, and encouraging views of the situation to those who soon will pass away is, that they are going to lay their burden on the shoulders of those who are well fitted to carry on the work and to accomplish even better results than we have done. I bid you with heart and mind and thought God speed.

THE PRESIDENT: We are all delighted to have had the presence of Dr. Gillett with us, and I am sure that I express the feeling of the members of the Association that this meeting would not have been complete without him. We thank Dr. Gillett for having come here.

CONSONANTS.*

DR. A. GRAHAM BELL : I propose in my lecture to-day to deal with the mechanism of speech. In my demonstrations I shall make use of Monroe's school-room charts, "Sounds Of The English Language," which contain good diagrams of the positions of the vocal organs in uttering English sounds. As you are professionally familiar with the subject it will be unnecessary for me to describe the correct positions unless in answer to questions. I shall therefore consider the mechanism of common defects. We shall consider first the defects of shut consonants.

DEFECTS OF SHUT CONSONANTS.

The labial letters, *p*, *b*, *m*, are not liable to errors of position. In forming *t*, *d*, *n*, slight changes of position do not offend the ordinary ear and may therefore be passed lightly by. The point of the tongue should be placed against the upper gum, but it may be shut against the teeth, even to the *th* position without producing a defect sufficient to attract the attention of any one but an articulation teacher. In forming *k*, *g*, *ng*, also, considerable latitude may be allowed so long as the position is too far forward. When it is too far back the defect at once attracts attention, and should be corrected. If you try to form a *k*, with your mouth opened as widely as possible, you will find it very difficult to raise the back of the tongue into contact with the soft palate. It is much more easy to produce the shutting action lower down by the approximation of the base of the tongue to the back of the pharynx. This produces the defective sound of *h* to which I have alluded (ɑ‹), a sound quite commonly given by deaf children. I am inclined to think that the defect is due to the mode of teaching. The teacher is very apt to open her mouth as widely as possible to show her pupils the position of the tongue. They imitate the action, and this naturally leads them to give too

*This lecture was delivered on Wednesday, July 8.

low a position. It is very difficult to correct a position that is too far back. I think the best way is to teach the sound anew. Take a position which is too far forward, for example, *t* (Ↄ), then manipulate the tongue. The same remarks, of course, apply to *g* (Ɛ).

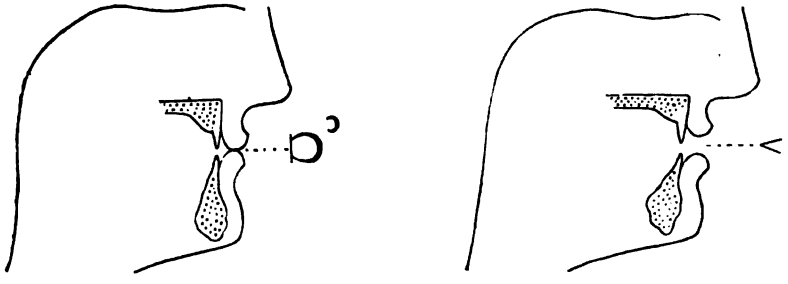
The shut consonants, though generally pronounced well by deaf children, are liable to a defect of a very extraordinary nature. In nearly every school for the deaf some pupils may be found who give clicks in place of these consonants. For example: *p* will be pronounced like the sound of a kiss, and *t* like the clicking sound we make as a sign of impatience, or like the cluck with which we hurry up a horse. I may not be able to tell you exactly what to do, but of one thing you may be sure,—the first step in the correction of a defect is to understand the mechanism of the defective sound. "Knowledge is power," and when we know the nature of a defect, ingenuity will find a remedy.

The first step then is to study the mechanism of the defective sound. How are you to investigate it? Imitate the defective sound yourself, and then study your own vocal organs.

Your pupil, we shall suppose, gives a kiss instead of the sound of *p*. Let us study the mechanism together.

When the lips are opened you observe that air goes into the mouth instead of coming out. Let us examine into the cause.

But first, let us express by means of symbols and diagrams the condition of our knowledge at each stage of the investigation, so that we may realize as clearly as possible what we are about.



First Position. Second Position.

Fig. 11.

Ↄ<

The first diagram in Fig. 11, illustrates the closure of the lips (Ↄ). The second shows, by means of an arrow-head, the direction of the air when the lips are opened (<).

Can it be that the pupil makes an effort of inspiration while he is trying to say *p*? How can we satisfy ourselves on this point?

Shut your lips and then open them with an effort of inspiration. Thus, (ᗡ<). At once you notice that the effect is very different from the sound of a kiss. In forming the kiss, then, the air does not enter the lungs (<), but only goes into the mouth as far as some point (◁) yet to be determined. (The symbol ᗡ< now becomes ᗡ◁).

Repeat the kissing sound many times—ᗡ◁ ᗡ◁ ᗡ◁, etc.,—while you observe what you do with your lungs. You will find that you can go on kissing for any length of time without stopping to take breath. You can breathe freely through the nose.

What conclusion can we draw from that? (1) The soft palate is depressed (ʃ).

(2) You can breathe freely through the nose thus showing that no constriction exists between the soft palate and the lungs.

Let us express this knowledge upon the diagrams we have made. Fig. 11 now becomes Fig. 12, and the symbol ᗡ◁ becomes ʃ + (ᗡ◁).

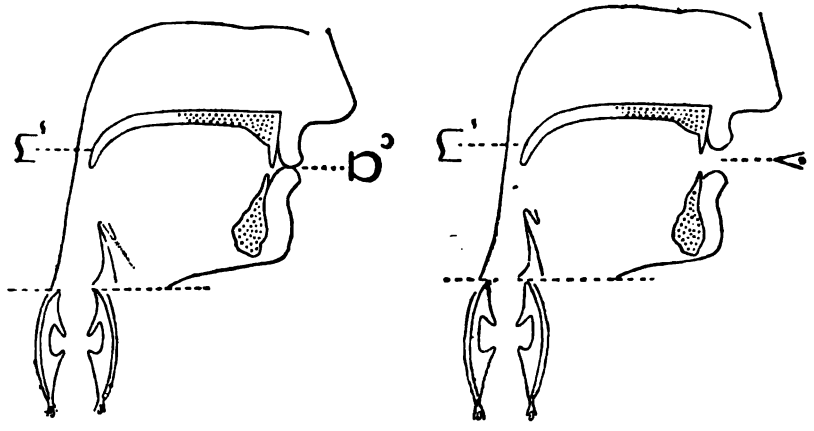


Fig. 12.

First Position. Second Position.

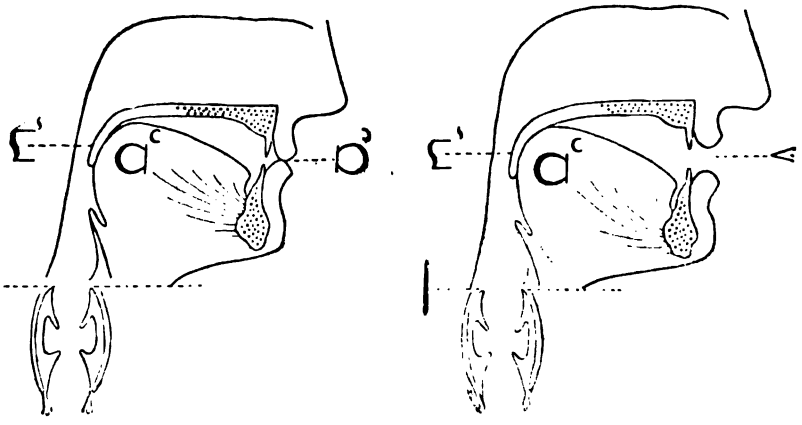
$$(ʃ+ᗡ)\ (ʃ+◁) = ʃ+(ᗡ◁)$$

Is anything further to be discovered? Think for one moment. If no other constriction exists than is shown on the diagram, then there must be an open passage-way into the mouth from the lungs, and air should escape through the mouth as well as through the nose. Does it do so? We know it does not, for when the lips are opened air enters the mouth in just the opposite direction (◁ and not >). The passage-way then must be closed somewhere between the soft palate and the lips. What organs are there in the mouth by

which the closure could be effected? We are limited in our choice to the point of the tongue, the "top" or "front" of the tongue, the back of the tongue, or to intermediate parts.

If you repeat the sound of a kiss, I think you will feel that the concealed shut position must be pretty far back in the mouth. Certainly the point of the tongue is not involved, and we are limited therefore, to the top or back of the tongue, with the probabilities in favor of the back. How can you decide the matter? Make a hypothesis, and then experiment upon your mouth to test the truth of your assumption. For example: Assume that the back of the tongue is shut against the soft palate (Ɑ). Fill in this position upon the diagrams. Fig. 12 now becomes Fig. 13, and the expression ı + (Ɒ◂) becomes Ɑ + (Ɒ◂).

Fig. 13.



First Position. Second Position.

$$(ı+Ɑ+Ɒ)\ (ı+Ɑ+◂) = Ɑ+(Ɒ◂)$$

Now study the diagrams and the symbols and try to establish some relation between the hypothetical position (Ɑ) and some sound of known formation. Then experiment upon the mouth to see if that relation holds good.

Now we know that Ɑ + ı = ɐ(*ng*).

If then your hypothetical position (Ɑ) is correct, you should get ɐ (*ng*), by adding voice to a kiss. Test the matter. Sound the voice continuously while you repeat the sound of a kiss.

ı + Ɑ + (Ɒ◂ Ɒ◂ Ɒ◂ etc.) = ɐ + (Ɒ◂ Ɒ◂ Ɒ◂ etc).

You at once recognize the familiar effect ɐ (*ng*), continuously sounded—like the drone of a bagpipe—accompanied by the equally familiar sound of kissing. This is proof that your assumption is correct.

A kiss = ɑ + (ɒ◂).

The defect, then, consists in the assumption of the *ng* position without voice (ɑ) while the pupil is trying to say ɒ> (*p*).

But why does the air go into the mouth when the lips are opened? The fact indicates that a partial vacuum exists there. This means that the cavity of the mouth had been enlarged while the shut positions were assumed, thus causing rarefaction of the contained air. The tongue, therefore, must have been moved before

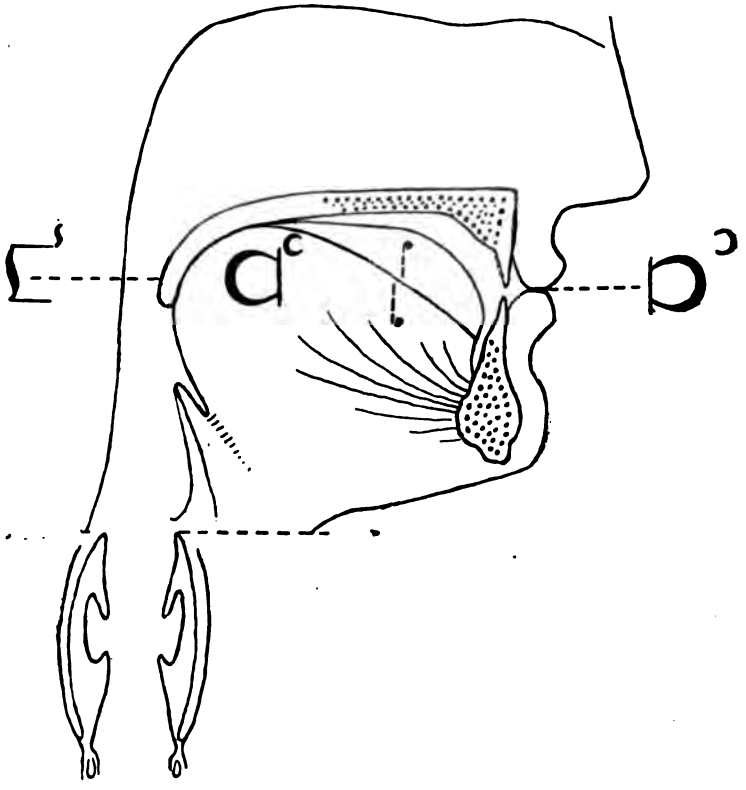


Fig. 14.

ʃ+ɑ+t+ɒ	ʃ+ɑ+t+ɒ
ʃ+ɑ+k+ɒ	ʃ+ɑ+k+ɒ
ʃ+ɑ+k	ʃ+ k+ɒ
ɑ+[ɒ+(t k)k]	ɒ+[ɑ+(t k)k]
or ɑ+(ɒ◂)	or ɒ+(ɑ◂)

the lips were opened. Any movement of the tongue that will enlarge the cavity, will produce a partial vacuum in the mouth, and thus lead to the production of the sound. The symbol ◂ (air going into a cavity) expresses the effect independently of the exact

positions assumed. Hence: ᑫ + (ᗤ), is a general expression and covers any change of position inside the mouth that will produce a partial vacuum there.

As a clear understanding of the cause of the click effect in this case will throw light upon the nature of clicks in general, it may be well to show some specific movement of the tongue that will produce the effect. For example: Suppose that the front of the tongue is elevated in the position for *e* in *eel* thus ᖴ (high front) when the shut positions are assumed. (See Fig. 14).· If then the front of the tongue is lowered into the position for *e* in *pet* (as shown by a dotted line in Fig. 14) thus ᒷ (low front), without changing the other positions, the cavity of the mouth is enlarged. As a partial vacuum then exists, air will rush in if an opening is made anywhere. For example:—

1. If you keep the back of the tongue closed against the soft palate and open the lips, air will rush in between the lips; ᑫ + (ᗤ).

2. If you keep the lips closed and open the passage-way be-between the back of the tongue and the soft palate, air will rush in the cavity from behind ᗡ + (ᑫ)

Suppose again that instead of starting with the tongue elevated you commence with it depressed ᒐ (as shown by dotted line Fig. 14,) and then elevate the tongue into the position for *e* in *eel* ᖴ, the cavity between the two shut positions is reduced in size and the contained air compressed. Then:—

3. If you keep the back of the tongue closed against the soft palate and open the lips, air will rush out of the cavity through the labial aperture ᑫ + (ᗡ); or

4. If you keep the lips closed and open the passage-way between the back of the tongue and the soft palate, air will rush out of the cavity into the pharynx ᗡ + (ᑫ).

Numbers 1 and 2 are suction clicks. Numbers 3 and 4 are expulsion clicks. Numbers 1 and 3 are both given by deaf children instead of *p* (ᗡ)

In order to have a click sound it is necessary that you should have a cavity in which the air is of different density from that outside. There must, therefore, be two constrictions of the passage-way which we may call *x*, *y*, with a cavity between them. If the air in that cavity is of less density than the air outside, the opening of the passage-way at either end will result in a sudden in-rush of air, forming a suction click.

If the air in the cavity is of greater density, an expulsion click will be produced. Double positions are, therefore, capable of producing two suction clicks, and two expulsion clicks which may be thus symbolized:—

1. $x + (y^{\lessdot})$
2. $y + (x^{\lessdot})$ } *Suction Clicks.*

3. $x + (y^{\gtrdot})$
4. $y + (x^{\gtrdot})$ } *Expulsion Clicks.*

In my use of the symbols—
> means air going out from the lungs;
< means air going into the lungs;
⪢ means air going out from a cavity;
⪡ means air going into a cavity.

I have alluded to two labial clicks made by deaf children instead of P. There is still a third which is quite common X + (D⪢).

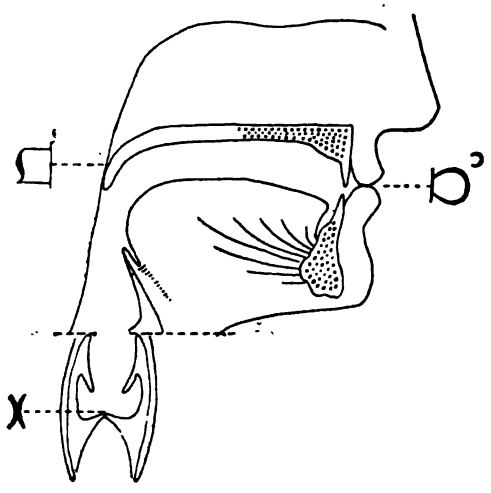


Fig. 15.

1. X + Ω + (D⪡)
2. X + (Ω⪡) + D } *Suction Clicks.*
3. (X⪡) + Ω + D

4. X + Ω + (D⪢)
5. X + (Ω⪢) + D } *Expulsion Clicks.*
6. (X⪢) + Ω + D

The inner shut position is produced by the closure of the glottis (X) (See Fig. 15), and the cavity between the two shut positions is

larger than in the case shown in Fig. 14. The sound therefore has a lower pitch than any of the clicks resulting from the positions shown in Fig. 14.

The pupil also is unable to breathe through the nose while producing the sound.

The closure of the soft palate against the back of the pharynx (◘) is of course assumed though not expressed in the symbol ✕ + (◘>). There are really in this case three shut positions, and theory therefore indicates the possibility of producing three expulsion and three suction clicks from the positions shown. Below Fig. 15 I give the symbols for the six clicks alluded to for the benefit of those who desire to study them. I need not describe them further in detail, as we meet with only one of them—the fourth—in our work.

The fourth click ✕ + (◘>) is sometimes given by deaf children in place of ◘> (*p*).

We meet with three click forms of ◘> (*t*), ☪+(◘<); ☪+ (◘>); and ✕ + (◘>)

The inner shut positions in each case is the same as that already noted for *p*.

K is subject to only one click ✕ + (◘>).

M is often given as a vocalized kiss ☪+ (◘<)—such a word as "mamma" for example, being pronounced as two kisses with the voice passing continuously through the nose. ☪+ (◘<◘<).

N is liable to a click of similar formation ☪+(◘<), but *ng* is never clicked.

B, *d* and *g* are subject to a very curious form of suction click resulting from the attempt to teach these sounds elementarily instead of in combination with vowels. A teacher, for example, will pronounce the sound of *b* without opening the lips (⊖), and place her pupil's hand upon her throat so that he may feel the vibration produced by the vocal cords. The voice cannot be prolonged because the closure of the lips prevents the escape of air. The pupil therefore feels only a momentary impulse of voice; and in attempting to imitate this effect, he makes a sudden muscular effort.

If you place your hand upon the pupil's throat while he makes the sound, you will observe a strong muscular effort causing an expansion of the whole throat. The cavity between the vocal cords and the lips is thus enlarged, creating a partial vacuum within. The slit-like aperture of the glottis is not large enough to permit air to freely enter the cavity from the lungs so as to restore the pressure

Upon opening the lips, therefore, air enters the cavity from outside, thus forming a suction click, I + (D<).

D and *g* are liable to a similar defect. For example: *d* = I + (D<), *g* = I + (G<). These clicks, unfortunately, are of very common occurrence.

TABLE OF CLICKS GIVEN BY DEAF CHILDREN.

For *p*.	G + (D<)	G + (D>)	X + (D>)
For *t*.	G + (G<)	G + (G>)	X + (G>)
For *k*.	———	———	X + (G>)
For *m*.	G + (D<)	———	———
For *n*.	G + (G<)	———	———
For *ng*.	———	———	———
For *b*.	———	———	I + (D<)
For *d*.	———	———	I + (G<)
For *g*.	———	———	I + (G<)

If you have followed me so far, you will recognize the fact that clicks result from double positions of the vocal organs. When, therefore, you hear a click, you know that there is a constriction somewhere which is concealed from direct observation. In studying the defect, therefore, your first object should be to discover where that concealed position is. The clicks most commonly given by deaf children result either from the closure of the back of the tongue against the soft palate (G), or from the closure of the glottis (X).

If the pupil can breathe through the nose, you may assume at once that the concealed position is G (*ng*, without voice). If he does not breathe through the nose, the location is more uncertain (either G or X). The pitch of the sound may help you here, for a click which is due to the closure of the glottis is lower in pitch than one due to the closure of the back of the tongue against the soft palate, because the cavity is larger. Perhaps the most certain plan of ascertaining the location is to cause the pupil to repeat the click for as long a time as possible without stopping.

If he is not breathing through the nose, nature will sooner or later force him to relinquish the concealed position in order to take breath. Watch for that moment. At the moment of relinquishment a sound will be heard which will enable you to determine by ear the location of the concealed position. For example: If the back of the tongue is involved you will hear the sound of *k* (G< or G>),

pronounced either with the air going in or out of the lungs. If the glottis is closed you will hear (χ> or χ<) the effect of throat shut followed by a puff of air. If you are uncertain whether or not the pupil can breathe through the nose, hold the nostrils closed with your fingers until the pupil's breath gives out. If the concealed position was ɑ (*ng* without voice) you should hear the sound of *k* (ɑ> or ɑ<) for ɑ − ı = ɑ.

The first step in the correction of a defect is a knowledge of the cause. With this knowledge the teacher can not only devise means (1) of correcting the defect, but (2) of utilizing it in the production of other sounds. Let us take as a typical case of a click defect, the sound of a kiss given instead of *p*. How can we correct it and how can we utilize it?

(1) *Correction of the defect.* In this case the cause consists in the assumption of a shut position (ɑ) which prevents the breath from reaching the lips. If then, we can devise any method of causing air from the lungs to press against the lips the assumption of the concealed position becomes impossible. For example: You can make your pupil blow feathers or pieces of paper away from his lips, or inflate his cheeks while trying to pronounce *p*.

These are simple expedients that are usually successful; but they may fail because it is perfectly possible to produce inflation of the cheeks and expulsion of air from the mouth, and yet have the back of the tongue shut against the soft palate when the lips are opened.

The characteristic puff heard during the production of a click is necessarily of very short duration. Then get your pupil to make a continuous effort of expiration. For example: Let him shut his lips and blow continuously through a very fine orifice between them (ɒɔı) as though he were blowing to cool something.

In producing a prolonged emission of this kind the air can only come from the lungs, and the assumption of any interior shut position is therefore impossible. It is true that the inflation of the cheeks suggested above, and the too small aperture between the lips just alluded to, themselves constitute defects; but they are easily corrected, because the actions are visible. A skillful teacher will not hesitate to substitute a defect that is easy of correction for one that is more difficult.

(2) *Utilization of the defective sound.* The moment you realize that the concealed shut position is ⊂ you will recognize the possibility of producing *ng* (⊂) from a kiss. For example: Get the pupil to add voice to the kiss.

$$[⊂ + (D◁)] + I = ⊂ + (D◁)$$

and at once you obtain *ng* combined with a labial action. By manipulation of the pupil's mouth you can prevent the lips from closing,

$$[⊂ + (D◁)] - (D◁) = ⊂$$

and you then get *ng* alone. If the pupil has not already acquired the sound of *ng*, you can thus utilize the kiss as a means of teaching it to him; and if he already has the sound and knows its symbol (⊂) then the presentation of the symbol for the kiss will convey to his mind an idea of the mechanism of the click. In correcting defects, it is surely advisable, if possible, that the pupil as well as the teacher should know the cause and understand the mechanism of the defective sound.

If then your little pupil should happen to give the sound of a kiss instead of the letter *p*, don't frown at him and say, "No, no, that is not right." Give him the symbol ⊂ + (D◁) and encourage him by a sign of approval.

He has tried his best and it is not his fault that he failed to give the sound you wanted. All sounds are but positions to him and he was right in his attempt—not wrong—for he imitated correctly the position which alone he could see—the position of the lips. Why then should we express disapproval? He had done nothing worthy of censure. The "No–no method" does not help him to correct the defect—and it does throw cold water upon honest attempts to please. Give him a sign for his sound, and reward his effort by approbation. If you do not know how to write the sound properly give him *x* as a provisional symbol—or invent a character to represent it. Say, "That is what you did, now do it again." The "No–no method" gives him the idea that it is wrong to make a noise of that kind. On the contrary, encourage him to repeat the sound so that you may study it and find out how best to utilize it in his instruction. If the sound is unfamiliar to your ear and you do not know how it is formed, that itself is a reason why you should hold on to it and not throw it away. When you have analyzed its

composition you may find it to contain gold where you only asked for lead. Let your pupil repeat the sound until you can imitate it yourself. Then study your own mouth. In the meantime do not let him forget the sound. Fix it by reference to the letter *x*, or some other mark, and when you have satisfied yourself how it should be expressed, substitute for *x* the proper symbol.

The meaning of the symbol need not be explained to a young child. It may be treated as an arbitrary sign. The expression ☪+(D<) need only mean to him, "That's what you did, now do it again." The deaf child soon comes to understand the application of the symbols even though he may not understand their full meaning. For example: When he knows that ☪+(D<) represents the sound he makes, then if you change the symbol to ☪+(D<) he will at once attempt to vocalize the kiss. He will do this even though he may be unable to analyze or understand the full significance of the expression.

The symbols of Visible Speech are invaluable as a means of correcting and utilizing defective sounds. Indeed, I think their chief value lies in their ability to express the mechanism of the sounds the children make, so as to show in a graphical manner their relation to the English sounds we wish them to give.

The methods suggested above are applicable to the correction of all the clicks of *t* and *k*. (See Table of Clicks).

DEFECTIVE COMBINATIONS OF *P*, *T*, *K*.

Pupils who are taught by means of Visible Speech have many advantages over those taught only by means of Roman letters and diacritical marks. Defects of combination, which are inevitable upon the latter plan, and which require the expenditure of much time and labor on the part of the teacher in order to correct them, need not arise at all when symbols are employed, and if they do arise are easily corrected.

Let me illustrate by a common case.

The position for *p* (D) by itself yields no sound, because the lips are closed. It is usual, therefore, to teach it in combination with an open position. Thus, D>. The lips are first shut and then opened to allow of the escape of a puff of air.

Here we have two successive positions represented by only one character *p*. This leads at once to a defect when *p* is combined with other letters, for the child naturally attempts to give

both positions (Ɔ>) wherever *p* occurs. Thus, *ps* becomes Ɔ>ʊ instead of Ɔʊ (a puff of air appears between the *p* and *s*). So also with *t* and *k*.

Ts becomes Ʊ>ʊ instead of Ʊʊ.
Ks becomes Ɑ>ʊ instead of Ɑʊ.
Tsh(*ch*) becomes Ʊ>Ω instead of ƱΩ, etc.

These defects are inevitable upon the Roman letter plan. Without the use of symbols it is difficult to explain the nature of the defect to a deaf child who knows no language. The teacher usually imitates the defective sound and exclaims, "Don't say Ʊ>Ω, but ƱΩ (tsh)," trusting to the quickness of the pupil's eye to discern the difference in her mouth. Your chief reliance is upon imitation, and if that fails you, where are you? Now, these defects need not arise at all when the sounds are taught by symbols; and when they do occur, they are easily corrected, because we can express the incorrect as well as the correct effect so as to exhibit the difference.

In teaching these sounds by means of visible speech we commence in the same way as that just described—by teaching *p*, *t* and *k*, as Ɔ>, Ʊ>, and Ɑ> but we employ two characters to express the two positions instead of one. Then when the sound of *s* (ʊ)is acquired we combine as follows:

1. "Say Ʊ>" "That is right."
2. "Now say ʊ" "Right."
3. "Now say Ʊ>ʊ" "Right again."

(Observe the difference in the attitude of the teacher towards her pupil. Here is the very defective combination of *ts* alluded to above. But the teacher of visible speech, having expressed the positions actually assumed by her pupil, can truthfully say, "That's right," with an approving nod—where the Roman letter teacher could only say, "No, no, that's wrong.")

4. "Now try first Ʊ>ʊ and then Ʊʊ."

Here the pupil's attention is directed to the *difference* between the two effects, and his aim is to give the last combination *without the puff af air* (>). Whatever he does, therefore, his aim is right—which is not the case on the Roman letter plan. And whatever he does, the teacher can give him a symbol for his sound and say, "That's what you did, now do it again."

In a little time quite a number of variations upon the sound of *ts* may be obtained. Anxiety to avoid the puff of air often leads

him to put it in—now in one place, now in another; for example, the pupil may say, ᗝ>ᑌ or >ᗝᑌ or >ᗝ>ᑌ, etc.

It is not the teacher's object to have him *forget* the incorrect sounds but to *remember* them and contrast them one with the other. The greater the number of slight variations that can be pronounced at will by the pupil the more power does he obtain over his vocal organs. A good marksman should be able to hit one mark just as well as another.

The sound of *ch* (tsh) presents exceptional difficulties to a deaf child. Even when the *t* is properly combined with *sh* without any puff of air between the two (thus ᗝΩ) your ear usually tells you that there is something wrong when the combination is uttered in a word.

I think the fault lies in the undue prolongation of the *sh* position (ᗝΩ↓). If you observe your own utterance of such words as chair, cheese, church, such, much, touch, watch, etc., you will notice that the tongue does not remain for any length of time in the *sh* position. The *sh* indeed constitutes a non-vocal glide, a mere transitional effect, between *t* and the succeeding element. The unnatural effect produced by prolongation is most marked when *sh* occurs finally, as in much, touch, etc. (ᗷ]ᗝΩ↓ ᑕ]ᗝΩ↓, etc.). I have rarely failed to obtain the vernacular effect from a deaf child by expressing the sound of *ch* final as ᗝΩ> instead of ᗝΩ. Indeed, as a general rule a non-vocal consonant occurring as a final element is most naturally given by a deaf child when the symbol for the sound is followed by >. For example:

(cuff) ᑕ]ᗡ> . (us)]ᑌ> (both) ᗷ‡ᖻ> (wish) ᗯ[Ω>
(cup) ᑕ]ᗝ> (nut) ᘜ]ᗝ> (sick) ᑌ[ᑕ> (maps) ᗯ[ᗝᑌ>
(cuffs) ᑕ]ᗡᑌ> (nuts) ᘜ]ᗝᑌ> (deaths) ᘜ[ᖻᑌ> (books) ᗷ‡ᑕᑌ>
(watch) ᗯ‡ᗝΩ>

Of course, when these words occur in the middle of a phrase, the puff of air must be omitted, for the phrase is pronounced as one word and the consonant is then no longer final.

CORRECTION OF THE DEFECTS OF *B*, *D*, *G*, *M* AND *N*.

It is difficult to pronounce the sound of *b* (ᗷ), without opening the lips and when a deaf child attempts to do this a defective sound arises which, when combined in a word with other sounds, produces the click form of *b* [I+(ᗝ<)] alluded to in the table of clicks. *D* and *g* are subject to a similar defect.

I would recommend combining these consonants with vowels from the very first. I commence with an indefinite vowel (I), which

may be *er* in her, *u* in up, or any indefinite vowel sound that the child can make. For example: *B, d, g* may be taught as ⦵ı ⦶ı ⦿ı (ber, der, ger, or bŭ, dŭ, gŭ, etc.) There is really no difficulty in teaching *b* in combination, for it can be manipulated while the child produces the vowel sound. Let the child prolong an indefinite vowel sound with his lips pretty close together. Now place your thumb and finger under his lower lip and move the lip rapidly up and down so as to close and open the labial aperture. This results in ⦵ı⦵ı⦵ı etc. (ber, ber, ber, etc.) Care should be taken to make the movement an opening not a closing action. The closure should be only momentary. The under lip should instantly rebound from the upper lip as a hammer rebounds from an anvil. Now teach the child himself to move his lip up and down with his finger. His attempt should be to pronounce the vowel (ı) continuously and make no muscular effort with the lips. After he can do this well let him try to move his lip rapidly up and down in the same way without the assistance of his hand. There should be no muscular tension, but on the contrary the lips should feel soft and loose.

You cannot manipulate the point of the tongue in this way, but when the pupil can pronounce ⦵ı⦵ı⦵ı, etc., analogy leads him to give ⦶ı⦶ı⦶ı etc., (der der der, etc.) and ⦿ı⦿ı⦿ı etc., (*gŭ gŭ gŭ* etc.)

The clicks of *m* and *n* are more difficult of correction. After the child can give ⦵ı⦵ı⦵ı etc., or ⦶ı⦶ı⦶ı etc., it is well to try whether analogy will not lead him to give ⦵ı⦵ı⦵ı or ⦶ı⦶ı⦶ı etc. This often succeeds, but in difficult cases the back of the tongue remains closed against the soft palate, thus converting the sound into ⦿(+D◁D◁D◁) or ⦿+(O◁O◁O◁ etc.) a continuous sound of *ng* accompanied by a succession of clicks. The defect is due to the retention of the back-shut position (O). I think, therefore, the best way to deal with a difficult case is to aim at control of the back of the tongue, so that the pupil shall acquire the power of elevating and depressing it at will. I would suggest taking the concealed position ⦿ by itself and combining this with an indefinite vowel sound thus: ⦿ı⦿ı⦿ı etc.

When he can do this well contrast it with ⦵ı⦵ı⦵ı etc., thus: ⦿ı⦿ı⦿ı ⦵ı⦵ı⦵ı etc., ⦿ı⦵ı⦿ı⦵ı etc. The analogy of the symbols will probably lead him to give the correct effect.

Wh and *w* (ⵔ and ⵡ) are very defectively given by deaf children, but I have already spoken of the mode of correction in a former lecture.

F, *v*, *th*, th, (ᴈ ᴈ ᴝ ᴝ) present no difficulties of importance. S, *sh*, *yh*, (ᴝ ᴓ ᴖ) and their vocal forms *Z*, *ʒh*, *y* (ᴝ ᴓ and ᴖ), are liable chiefly to faults of position. That is, the tongue may be a little too far forward (ᴈ); or too far back (ᴈ); or too high up. There may be too much compression of the passage-way (ᴧ); or too little compression (ᴠ).

My plan of correction is—to write what the pupil does, using these modifiers according to the character of the defect to be symbolized. For example: ᴓᴈ ᴓᴈ ᴓᴠ ᴓᴧ etc.

I then get the pupil to vary the position slightly and contrast the new position with the old making him pronounce both sounds alternately so as to observe their difference.

In difficult cases it is well to manipulate the non-vocal forms *s*, *sh*, and *yh*, (ᴝ, ᴓ, and ᴖ,) from *Th* (ᴝ) in the manner I have already described in answer to a question. When these are well fixed the vocal forms follow as a matter of course by the addition of voice.

VOWELS, GLIDES, AND COMBINATIONS.*

DR. A. GRAHAM BELL : I have advocated the very general use of an indefinite, in place of a definite vowel sound in unaccented syllables. You must not, however, suppose from this that I undervalue vowels, or deem accuracy of vowel quality of no practical importance in our work. Far from it. I only mean to insist that vowels are of secondary importance to consonants.

Consonants give intelligibility to speech, but vowels give beauty of utterance. Consonants constitute the back-bone of spoken language—vowels the flesh and blood. You cannot do without them.

We want our pupils to acquire, not merely an intelligble articulation, but also, if possible, a natural and pleasant quality of speech. We must, therefore, attend to the vowels. It is neither necessary, however, nor advisable, that every vowel in a phrase should be given its full value. Unaccented syllables should be toned down like the shaded portions of a picture, thus bringing out by contrast, the accented parts of words.

Beauty of utterance depends as much upon shading as upon form—as much upon the due subordination of the unaccented syllables as upon accuracy of vowel quality.

It is a very difficult thing, even for hearing persons, to give unaccented vowels their proper sounds without bringing them out too prominently, so as to produce that pedantic style of pronunciation which is often mistaken for elocution.

The really good speaker gives the proper value to unaccented vowels without italicizing them to the ear. The mass of the deaf, however, are no more able to do this, than the mass of the hearing. Indeed, the attempt results in a much more unnatural effect than

* This lecture was delivered on Thursday, July 9, 1891.

the utterance of the pedantic speaker—because the vowel quality itself is usually defective. Under such circumstances indefiniteness is of importance. It produces, not a worse, but a better effect. You must not suppose, when I advocate a careless utterance of unaccented syllables, that I am urging you to teach worse speech than your pupils now possess; on the contrary, I believe that the result will be recognized as a great improvement. You will tone down sounds that are usually defective so that they will not come out so prominently to the ear; and accent, which is now conspicuous chiefly by its absence, will be produced by the subordination of the unimportant parts of words.

Give as definite vowels as possible in the accented syllables, but don't be too precise about the others.

Vowels are the most difficult elements we are called upon to teach. Why is this so? The discovery of the cause may perhaps enable us to devise a remedy. Let us examine into the matter.

How do vowel positions differ from the positions that yield consonant sounds? They result from larger apertures. Can this have anything to do with the difficulty of the acquirement? It seems so, for wide-aperture vowels are more difficult to obtain in perfection than the others.

Get a pupil to prolong a small-aperture vowel. The sound, even when defective, has a definite quality of its own. A lower position of the tongue, however, yields an effect of indefinite kind. The oral aperture is usually too large and the sound, when prolonged, is unstable and variable in quality, showing that the pupil finds difficulty in retaining the position unchanged.

Sometimes the attempt results in a visible trembling of the tongue.

In forming consonants and small-aperture vowels, the tongue makes actual contact with the upper part of the mouth at one or more points; but in lower positions it is hung in the air, so to speak, without anything against which to press. Extend your arm and you can easily retain it in a fixed position if you press your hand against the under surface of a table or shelf, but extend it in the air and I fancy you will find more difficulty in keeping it still. Your hand—if you do not watch it—is apt to waver like the unsteady tongue of the deaf child, and a constant tendency exists to a lower position.

Your ear aids you in the retention of a vowel position, because any change affects the quality of the sound.

Try to keep your tongue still, without making any noise, and you will appreciate the difficulty experienced by your pupil. He lacks a guide.

Give him a mirror and at once he becomes conscious of the movement of his tongue.

The sound is your guide, and if you merely think of the sound, that helps you to retain the position. His guide must be sight, and by seeing he will learn control. The thought of the image he has seen in the mirror will help him, as the thought of the sound helps you.

I cannot over estimate the value and importance of a mirror in articulation work. It is not enough that a pupil should watch his teacher's mouth, he must see his own. Accuracy and definiteness of sound depend upon the ability to retain a position unchanged. Indeed, as I said in my second lecture, control over the vocal organs is gained not so much by moving them as by keeping them still. Clearness of pronunciation depends upon the ability to enunciate every element in a word with clearness and deliberation. A poor speaker finds difficulty in uttering a word slowly or separating it into its component parts.

Give your pupil a mirror and let him learn to keep his tongue still. It doesn't much matter what he does, so long as he assumes different positions of the tongue, retaining each for some time without motion.

Little children delight to puzzle one another by assuming unusual positions of the tongue which the others cannot imitate. They should be encouraged in this, for all exercises of that kind are of value as a preparation for speech. By such exercises they unconsciously gain control over their vocal organs and become better able to imitate positions of the mouth. They feel ascertain muscular exertion and see the effect in the mirror, and this constant association of seeing and feeling ultimately enables them to realize by muscular sensation alone exactly what the tongue is doing.

I consider a looking glass as a necessity in the school-room. You can no more expect to teach a deaf child good speech without a mirror than you can hope to teach a hearing child to paint well without letting him see the result of his efforts.

I would especially recommend as an exercise before a mirror alternately narrowing and broadening the tongue. The attempt to narrow the tongue causes it to become stiff and hard to the touch, with a rounded surface. When it is broadened the surface becomes

flat and soft. The most common fault, I think, among deaf children is an exaggerated muscular action leading to a stiffening and narowing of the tongue. For example: Many children in trying to form ſ (*ee*) make so much muscular effort that the tongue feels hard. The tongue is narrowed and fits up into the arch of the palate, making contact with the top of the hard palate, and though a centre aperture exists over the front of the tongue the effect of the vowel ſ is not produced. I have found C (the German *ch*) to be a very important position. It forms, indeed, the key note to the vowels. As a general rule if a child can pronounce C you can teach him to glide the tongue forward (C›) and backward (C‹), retaining the small centre aperture, and by getting him to do this as far back and as far forward as possible. The latter position generally gives O, which, by the addition of voice, becomes a good ſ (*ee*). In difficult cases I have found it a good plan to give the pupil the idea that O is C modified by expansion of the tongue so as to press sideways against the molar teeth on each side instead of pressing up into the arch of the palate. In some cases the simple direction to broaden the tongue will correct the defective ſ (*ee*).

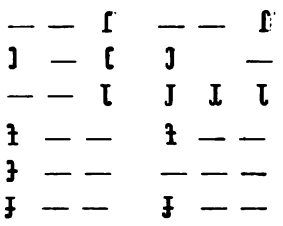
Pupils sometimes give ɪ or even l for ſ (*ee*), and sometimes ſ ɪ or l. These defects arise from the attempt to say *ee* with the teeth too far apart. You cannot pronounce (*ee*) properly with the mouth wide open. A teacher, however, is apt to separate the teeth as much as possible in order to show her pupil the position of the tongue. The pupil imitates the opening of the jaws, and this is apt to result in a position of the tongue too far back (ɪ or l) or in a position having too wide an aperture (ſɪ or l).

I give below a tabulated list of the elementary vowels used in the English language arranged in such a manner as to show their place in the complete vowel scheme elaborated by my father.

MELVILLE BELL'S VOWEL SCHEME.

l	ɪ	ſ	l	ɪ	ſ
ȷ	l	ſ	ȷ	l	ſ
J	I	ſ	J	I	ſ
ɬ	ɬ	f	ɬ	ɬ	f
ȝ	ɬ	f	ȝ	ɬ	f
ȝ	I	ɬ	ȝ	I	ɬ

ENGLISH VOWELS.



Some one has observed that you may at any time produce a Scotch air by striking at random the black notes of the piano. The musical scale of the Celts is defective. Examine the gamut of vowel sounds as given by my father, and you will notice that the English ear seems to be as defective for vowel sounds as the Scotch ear is for musical notes. Only three of the back series of vowels are used in the English language; two of the mixed series, and five of the front series. Out of the eighteen round vowels, only five in all are employed in our language.

You will observe a curious likeness between the peculiarities of the "front" and "back-round" series of vowels. The first one of each series (and) is always of long duration in English, and the second (and) always short. The third (and) never occurs by itself, but is used simply as the initial part of the diphthong. The sound ends with the gliding of the tongue to the high vowel of its series. Thus is pronounced as (*ā*), finishing off with the gliding of the tongue towards the position for (*ee*); and ; *oh* is given as , finishing off with a glide towards the position for (*ōō.*) The fourth vowel of each series is wanting in English. The fifth vowel of the front series (*e* in *pet*) is sometimes long and sometimes short. The fifth of the back-round series, however, (*aw*) is always long. In both series the sixth vowel (or) is always of short duration.

It may also be noted that the mid-back vowel (*u* in *up*) also is always short.

These peculiarities of duration do not necessarily pertain to the vowels, but are mere matters of English usage. Many persons have the mistaken idea that the vowels in the words *eat*, and *it; pool* and *pull; caught* and *cot; calm* and *come*, are the long and short forms of the same vowels, but if you sing these words you will recognize that the vowels remain distinct to the ear when equally prolonged; and you can shorten the vowels in the words *eat, pool, caught* and *calm*, without producing *it, pull, cot* and *come*. In fact, this is the pronunciation given for these words by French speakers of English.

I am inclined to think that there is some natural cause for the analogous peculiarities appearing in the front and back-round series of vowels, because I notice in both dialectic and individual utterance that variations from the standard, appearing in one series, have their analogues in the other. For example: where [illegible] (ā) is pronounced [illegible] without any gliding of the tongue toward [illegible] as in Scotch and in Continental pronunciation, you find also that [illegible] (ō) is pronounced [illegible] without the [illegible] glide.

So, too, where individual speakers give [illegible] or [illegible] for [illegible] (ā) they also usually say [illegible] or [illegible] for [illegible] (ō), etc.

Examine the table of English vowels and you will see that the front and back-round series are nearly complete, and you will recognize at once the importance of [illegible] (ee) and [illegible] (*oo*), for from them the other vowels of their series can be developed by simply enlarging the aperture.

The mixed vowels ([illegible] and [illegible]) and the back vowels ([illegible] [illegible] and [illegible]) present no difficulties, for the following reason: any sort of an indefinite sound will pass for [illegible] (*er* in *her*) and [illegible] (the sound of the indefinite article *a* in a sentence) differs so slightly from this that there is no need of distinguishing between them. In unaccented syllables I would express these two sounds indiscriminately by (ı) the voice sign.

[illegible] (*a* in ask, path, etc.) also differs so slightly from [illegible] (*a* in father, calm, etc.) that there is no need to bother a deaf child with the distinction. I teach and write them both as [illegible] and few deaf children have any difficulty in giving the sound.

Then, again, this may be considered as identical with [illegible]. For example: though the vowels calf and cuff are really different vowels in teaching the deaf, we may consider them as the long and short form of the same vowel, because, as a matter of fact, a deaf child gives [illegible] when he attempts to shorten [illegible]. It should be noted that this vowel [illegible] (*u* in up) like [illegible] (*u* in pull), and [illegible] (*o* in on) never occurs by itself or as a final element. I would not, therefore, teach these sounds elementarily, but always in combination with a succeeding consonant. The short effect should not be produced by a sudden impulse of voice, but by cutting off the sound by the assumption and prolongation of the succeeding consonant. For example: let a child prolong (ı)the vowel [illegible] and wind up with a softly uttered [illegible], and you get the effect of "calf" ([illegible] = [illegible]). Whereas, let the child attempt to give the same vowel sound, but prolong the [illegible] position, jumping as quickly as possible

from the ɑ to the ɜ position and you get the effect of "cuff" (ɑ]ɜ = ɑ]ɜ↻.) So with *calm* and *come*. If he tries to give the same vowel sound to both, prolonging the ɘ in the latter word, passing quickly from the ɑ to the ɘ position, you will, as a matter of fact get ɑ]ɘ although he tried to say ɑ]ɘ with a shortened vowel and a prolonged consonant. I find in the case of the other short vowels ɪ ɟ and ɾ that deaf children generally produce the proper effect by attempting to pronounce them as ɪ ɟ and ɾ, passing quickly over the vowel to the succeeding consonant and prolonging it. Thus if a child pronounces ɒɪω (*pool*) correctly, let him prolong the ω passing as quickly as possible from the ɒ to the ω and he produces the effect of ɒɪω (*pull*). So with the word *foot*. Let him try to pronounce it as ɜɪʊ↻, prolonging the shut position ʊ of the *t*, and passing as quickly as possible from the ɜ to the ʊ↻, and you get the proper vernacular effect ɜɪʊ↻. So with ɟ. You can convert *caught* into *cot* by prolonging the shut position (ʊ) of the *t*, (ʊ↻) or *gaud* into *god*, by prolonging the *d* (ɷ.)

The vowel ɾ is the most frequent vowel in the English language. It is rarely necessary, however, to explain to a deaf child that it differs from ɾ in any other respect than length. As a general rule, if the deaf child prolongs the shut position (ʊ) of the *t* (ʊ↻) in the word *eat*, passing quickly over the vowel position, the vernacular effect of it is produced (ɾʊ↻ = ɾʊ↻). Indeed, in all short vowels the succeeding consonant is prolonged.

MR. LYON: How would you distinguish the final *y* in words; would you use that same sound?

DR. BELL: Yes.

MR. LYON: In that case you would not have a consonant folfowing.

DR. BELL: That's true. The other short vowels ɪ ɟ and ɻ are always succeeded by consonants. I think this is also true of ɭ and perhaps of ɭ except when followed by ɪ (*er.*) I do not think any of the short vowels excepting ɾ occur as final elements. The correct sound of final *y* is ɾ (*i* in it). As a general rule the pupil will give the effect correctly if he tries to make the sound ɾ (*ee*) carelessly, with little muscular exertion. I, therefore, begin by getting him to try to say ɾ (*ee*) softly. If the effect of ɾ results, well and good. I leave it alone. If, however, we obtain too pronounced an ɾ (ee) I then explain that the aperture is too small. The great trouble is that if you tell a deaf child that ɾ has a larger aperture than ɾ he is apt to exaggerate the difference and give too large an aperture.

Whereas, if you don't say anything at all about the aperture the attempt to say ʃ with little muscular exertion usually results in a satisfactory ʃ.

I give below a table of the English vowels, as I teach them to the deaf, arranging them so as to show their place in my father's complete vowel system already given.

—	—	ʃ	—	—	—
—	—	—	ʒ	—	—
—	—	ɭ	—	ɪ	—
ɨ	—	—	—	—	—
—	—	—	—	—	—
ɟ	—	—	—	—	—

The short vowels ʃ ɨ ɟ and ʒ, as I have already explained, may be considered as identical with ʃ ɨ ɟ and ʒ, save in exceptional cases, where the organic difference must be explained.

The medium aperture vowels ʃ and ʒ are only used in English as the initial parts of the diphthongs ʃr (*ā*) and ʒɨ (*ō*). They are usually so difficult of acquirement that we are generally forced to accept ɭr and ʒɨ for ʃr and ʒɨ. The distinction of sound is so slight, however, that the error is surely immaterial.

ʃ (*ee*) and ɨ (*oo*) in unaccented syllables become ʃ (ĭ) and ɨ (*o͝o*) in ordinary speech. For example: the word *the* by itself is ɯʃ (thee), but when unaccented becomes ɯʃ; ɯʃɵɟr ɯʃʊʃrɵɯ, "thĭ boy, thĭ table," etc. The word *to* by itself is ʊɨ, but in unaccented positions becomes ʊɨ, as "I gave a book ʊɨɯʃɵɟr [to͝o thĭ boy]."

We are so accustomed to give indefinite vowels in unaccented syllables that any sort of indefinite vowel effect is more acceptable than a precise pronunciation such as would be given if the syllables were accented. For example: ʊɪ ɯɪ ɵɟr (tŭ thŭ boy) rapidly and indefinitely uttered would be more acceptable to ordinary ears than ʊɨ ɯ rɵɟr (too thee boy) precisely uttered. In fact, in all unaccented syllables ɪ is better than a precise vowel. ʃ and ɨ should be given for ʃ and ɨ, but ɪ is better than an incorrect ʃ or ɨ.

MR. LYON: That does not differ materially from the sound of *u* in up as we usually hear it.

DR. BELL: It is an indefinite sound, somewhat like that, but more like *er* in her.

MR. CROUTER: Don't we get that effect in the word "carpet" by dropping out the vowels?

DR. BELL: Yes, we can use this indefinite sound (ı) in place of the *r*.

MR. CROUTER: I was not speaking of *r*, but take any case, the consonants may be held together in a word and you pass over from one consonant to the other and this indefinite vowel sound is produced.

DR. BELL: Yes, it usually occurs as a transitional effect. For example: In the last syllable of "carpet" carelessly uttered.

MISS BLACK: What sound do you give the final *y*?

DR. BELL: Give me a word, Miss Black.

MISS BLACK: Well, "Mary."

DR. BELL: ſ (*i* in it.) I would write the word ɘʅıɯſ, although many Americans say ɘſrɯſ. When the letter *r* occurs between two vowels, and the first one is long, English usage demands the insertion of voice-glide (ı) between the long vowel and the medial *r*, thus fairy (Ʒʅıɯſ) weary (ɘſıɯſ) fiery (Ʒʃrıɯſ) fury (Ʒnɨıɯſ), etc.

When the letter *r* occurs finally or before a consonant, for example—ear, poor, farm, warm, etc.; the *r* (ɯ) is not pronounced. Even elocutionists demand only a gliding of the tongue toward the position for *r* (ɤ). Thus ſɤ Dɨɤ Ʒʃɤɘ ɘʄɤɘ etc.

When deaf children, however, attempt to give glide *r* (ɤ), they exaggerate the effect and produce a consonant sound. (ɯ), thus ſɯ Dɨɯ Ʒʃɯɘ ɘʄɯɘ, etc.

The effect is at once recognized as peculiar. Defective combinations usually result in such words as Ʒʃɯıɘ (farum) ɘʄɯıɘ (warum), etc. When the consonant *r* itself is defective, as it often is, for example: ɯⁿ or ɯᶜ, the effect is so unnatural that it would be better to omit the *r* altogether. Many hearing people fail to give an *r* of any sort in such words as the above, and I would recommend the omission of the glide *r* (ɤ) in teaching the deaf. The voice glide (ı) answers every purpose and is easily uttered. When a deaf child gives that in place of (ɤ) no one but an elocutionist could tell the difference. For example: Let the child give ſı (ear) Dɨı (poor) Ʒʃıɘ (farm) ɘʄıɘ (warm). Indeed, in the last cases even the voice glide itself may be omitted without any very marked peculiarity. Thus: Ʒʃɘ (fahm) ɘʄɘ (wawm). This surely would be more acceptable than the pronunciation usually given by deaf children, for these words.

When *r* occurs as a final and the next word begins with a vowel, a consonant *r* is usually required. ɯʅı would be to ordinary

ears a satisfactory pronunciation of the word "there," but if you put that into a sentence where the next word commences with a vowel (for example, "there is," etc.), then ᾧ[ſᾧ would not prove acceptable, and we must introduce a consonant *r* thus ᾧ[ıωſᾧ.

MR. BOOTH: There is a dispute in Philadelphia as to how the word "butter" should be pronounced. Will you please symbolize it?

DR. BELL: If I wrote it for an elocutionist, I would express it so ϴ]ᗣ[ᵡ; but if I wrote it for a deaf child I should write ϴ]ᗣı.

MR. BOOTH: Pronounce it, please.

(Dr. Bell here pronounced the two forms in contrast).

DR. BELL: Now it is a very difficult thing to get a deaf child to say ϴ]ᗣ[ᵡ without an exaggeration of the glide *r* element that produces an unnatural effect, but any child can give ϴ]ᗣı which is perfectly satisfactory to most ears. If you didn't know there was no *r* there, you would never find it out.

MR. KIRKHUFF: Should the *r* in "butter" and "father" be sounded as distinctly as the Middle States people do, or should we adopt the New England pronunciation?

DR. BELL: I should drop it altogether.

MR. KIRKHUFF: I am not speaking of deaf people.

DR. BELL: I consider this a free country, and can only say that in good English usage no consonant *r* is sounded in such words. There is a gliding of the tongue towards the position for *r*, but the voice dies away before the position is fully reached. I would have the deaf child give simply the indefinite vowel (ı) for the whole syllable *er* in such words.

In English utterance two other glides (ɤ and ɜ) are employed in the diphthongal vowels.

In forming ɤ the tongue glides towards the position for ϑ (*y*) or ſ (*ee*); and in forming ɜ the glide is towards the position for ᘐ (*w*) or ɬ (*oo.*) Diphthongal sounds present great difficulties to the deaf and are rarely given correctly. Both the initial and final positions are apt to be wrong, and a strong tendency is manifested to prolong the final instead of the initial part of the diphthong.

My plan of correction is to write what the pupils do, so that they may see the difference between they sounds the actually utter and those we wish them to give.

My father has not provided a sufficient number of glide symbols to enable us to represent the incorrect sounds uttered by our pupils, and I have, therefore, found it advisable to express glides by vowel

symbols upon a small scale. This gives us a sufficient number of forms without introducing new symbols. For the deaf I write the diphthongs [ʌ]ʌ ʃʌ ʒɜ]ɜ as [ɾ]ɾ ʃɾ ʒɬ]ɬ;

The common defect of prolongation of the final element can be expressed as [ɾ]ɾ ʃɾ ʒɬ]ɬ. and when the combination is dis-syllabic this becomes [ɾ]ɾ ʃɾ ʒɬ]ɬ.

In teaching such a diphthong as]ɾ, I commence in the following manner:

Say]. Now say ɾ. Now]ɾ]ɾ]ɾ, etc.
Now]ɾ]ɾ]ɾ, etc. Now]ɾ]ɾ]ɾ, etc.

Whatever variations occur during the course of the lesson are repersented symbolically, and the pupil is requested to repeat them in contrast with the correct sound. Thus: "You said]ɩ. Do it again]ɩ]ɩ]ɩ etc." "Now give]ɩ]ɾ]ɩ]ɾ etc." "Now you said Iɾ. Try it again Iɩ Iɾ Iɾ etc. Now give]ɾ]ɩ Iɾ etc."

The principle of correction is: *write what the pupil does, and then get him to repeat the incorrect sound in contrast with the sound you wish him to utter.*

I do not think it is possible to obtain great accuracy of vowel quality without the use of symbols of some sort for incorrect sounds, and the adoption of the principle referred to above. The symbols of visible speech are of great utility for this purpose. Indeed, I believe them to be essential. Without them you can only hope for approximations to the correct vowel positions. Without them your great, and indeed your only reliance must be upon imitation. In any case the power of imitation should be developed by constant practice before a mirror.

I always teach ʃɾ (*ā*) and]ɾ (*ī*) in contrast with one another, so as to make the pupil familiar with the difference. These diphthongs are apt to be pronounced alike as Iɾ or ɩɾ. For example: A pupil will say ɩɜɩɾɷɷɩɾ, instead of ɩɜ]ɾɷɷʃɾ (fine day). For the same reason I teach ʒɬ and]ɬ in contrast.

In giving ʒɾ, pupils generally give too small an aperture between the lips for the initial position. I think this results chiefly from the spelling (*oi*). They try to give an *ō* followed by short *i*. Indeed, very often the *o* is followed by glide *oo*, thus making a dis-syllabic compound something like ʒɬɾ. For example: ɵʒɬɾ (bo-ee) for ɵʒɾ (boy).

Sounds that differ only slightly from one another should, I think, he taught together, in contrast as the best means of securing

a distinction. Thus: teach [r] [l] and [f] as one group, and [th] and [dh] as another.

I would also practice such compounds as [r] [l] [f] (vowels in *layer, liar* and *lawyer* written [w][f] or [w][m]). [th] [dh] (vowels in *sower* and *sour*). In such words as *sore* and *more* there is no glide, Many persons say [s][h] [z][h]. My father would write [s][h] [z][h], but I should recommend a still larger aperture in teaching the deaf. I would write [s][f] and [z][f] (saw-er maw-er) for "sore" and "more," and [s][th] and [z][th] (so-er and mo-er) for "sower" (one who sows) and "mower" (one who mows).

It is very difficult to get a deaf child to distinguish [e] from [e] (*e* in pet, from *a* in pat.) It is important, however, that the attempt should be made, as the slight difference of sound often makes a great difference in the sense. For example: Met, mat, bet, bat, etc. The distinction is best obtained, I think, by practice before a mirror.

Vowels are so difficult of acquirement by the deaf with accuracy and precision that we may consider it fortunate that usage tolerates considerable latitude in the pronunciation of these elements.

The precise shade of vowel quality given in one part of the country is not heard in another. Travelers in England are startled by the cry [k][ə] [s][i] [k][ə] [s][i] ("Keb, sir, keb, sir,") from the cabmen in London., The Irishman says "oi" for I. Many Americans say [f][ɪ][s][ɔ] for [f][ɪ][s][ɔ] (first) and everywhere we hear [ɪ][w][ɪ] for [th][w] (oh, no.)

Certain defects are recognized as individual, or family peculiarities of speech; others are characteristic of whole communities and constitute a provincial utterance or dialect; and still others reveal the nationality of the foreigner.

I think I am pretty safe in saying that the "standard pronunciation," like the "average school boy," nowhere exists! We all depart from it in a greater or less degree. Study the character and extent of the variations that exist among educated people and don't be too critical of defects of your pupils if they fall within those limits.

The pronunciation of the consonant elements of speech is so uniform in all English-speaking countries that very slight variations are received as foreign sounds, while greater departures from the standard convey the idea that the vocal organs are themselves defective. People speak of "curing" such defects, as though they were diseases, or the result of malformations, requiring the surgeon's

care. Vowel peculiarities, on the other hand, fail to convey this idea and are more suggestive of provincial or foreign utterance.

Small-aperture vowels, like ɨ or ɾ, are given everywhere with substantial uniformity, and any marked deviation from the standard is suggestive of foreign birth. Vowels of larger aperture are constantly mispronounced by the best educated people. Even cultivated Bostonians, for example, sometimes call their own city ʘɪʊʊɪʊ (Bahston). Unusual variations from the standard if of slight extent, are suggestive of provincialism, and where the departure is greater the speaker is supposed to be a foreigner.

From this it will be seen that exactitude of pronunciation is more necessary with certain sounds than with others. Consonants and small-aperture vowels in accented syllables must be accurately given; whereas considerable latitude may be allowed in the pronunciation of medium and large-aperture vowels, and of diphthongal sounds wherever they occur. This is fortunate, for these are just the sounds that are most difficult of acquirement with definiteness by our pupils.

I would direct your attention to the very great importance of training a child to retain a position unchanged, until directed to relinquish it. The common practice of pronouncing an element of speech and then immediately relinquishing the position leads the child to consider the relinquishment as an essential feature of the sound. In speaking he relinquishes one position before he assumes the next, thus producing a transitional effect or glide sound between the elements. This sound appears either in a vocal (ı) or non-vocal (>) form, according as the elements themselves are vocal or non-vocal.

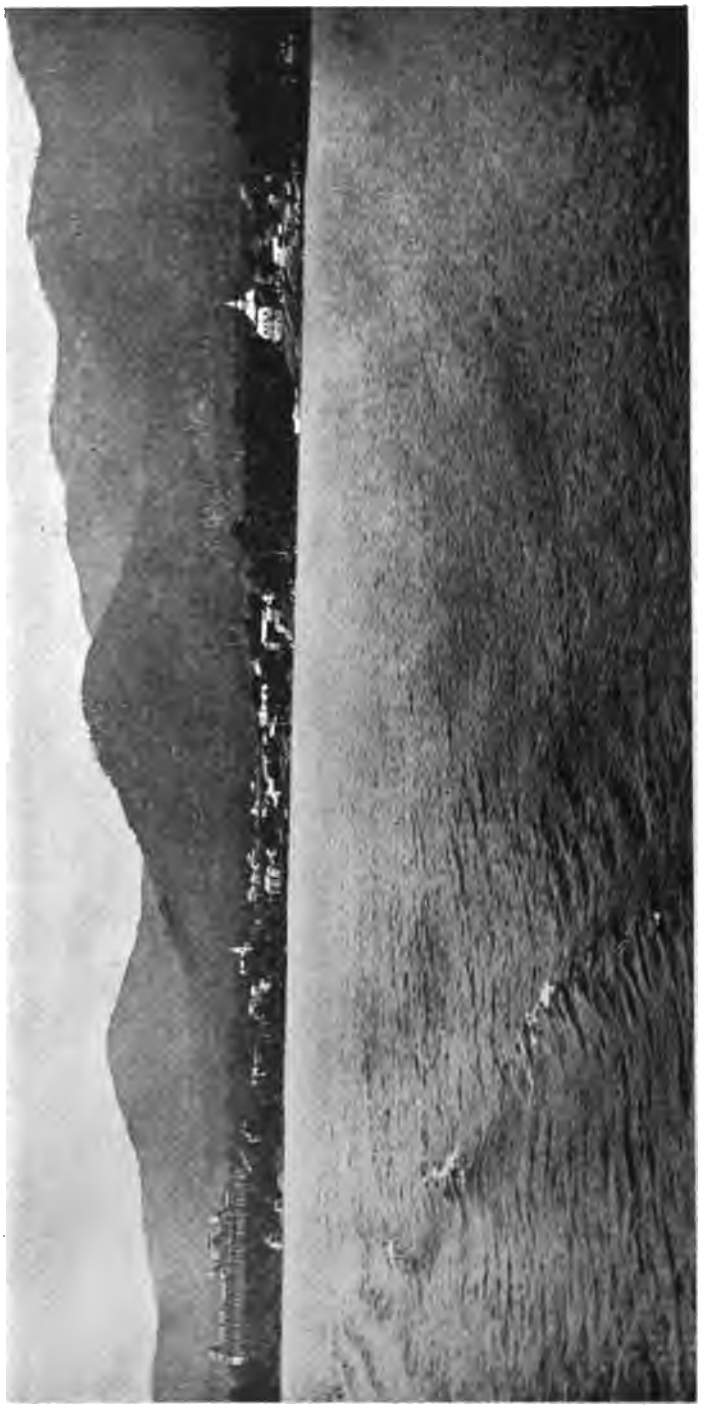
Ask the average deaf child to say ʘɾʘɾʘɾ (bee-bee-bee) and you will obtain ʘɪɾɪʘɪɾɪʘɪɾɪ. The tongue is raised for ɾ and depressed for ʘ so that it moves up and down for every syllable. Pronounce ʘɾʘɾʘɾ yourself and you will find that the tongue does not move at all but remains continuously in the ɾ position. The movement is entirely labial. This defect of combination runs through all the elements.

The great principal to be kept in mind is that positions do not merely succeed one another like the letters on a printed page, but overlap. A position must be retained until the mouth is in position for the next element.

In teaching the principle of combination to a deaf child, I would recommend you to commence with the vowel ɾ. Get your

pupil to prolong ʃ while you open and close his lips with your fingers. At once you get ɵʃɵʃɵʃ. Direct the child's attention to the fact that the tongue remains in the ʃ position all the time, and in fact that it does not move at all. Then get him to manipulate his own lips and then to produce the effect without manipulation. When he can do this well, try ɷʃɷʃ, etc,, and the analogy of the symbols will help him to give the correct effect. Let him have the idea of retaining the ʃ position continuously while he moves the point of the tongue. Then try ɛʃɛʃ, etc., retaining the ʃ position while he moves the back of the tongue. The chief difficulties of articulation teaching lie not so much with the elementary sounds as with their combination into syllables. A deaf child may be perfectly able to give every element and yet be unable to utter a sentence that is intelligible to ordinary people.

The most important point, I think, in the whole of articulation teaching is the thorough comprehension by teachers and pupils of the law of combination.



CALDWELL—LAKE GEORGE.

SPEECH READING

The substance of this lecture will be incorporated in a special Circular of Information, regarding Speech reading, which Dr. Bell has been requested to prepare.

After his remarks upon Speech reading Dr. Bell said:

I should like in conclusion to say a few words upon the general subject of articulation teaching. We don't know yet how best to teach speech to the deaf. If we did we wouldn't be here. We have come here to learn from one another in the hope of improving our methods of teaching. Now I am inclined to think that the more nearly we can pattern our methods of teaching after the method adopted by nature in teaching speech to hearing children, the better should be our results. It is certainly the case that the methods usually employed in schools for the deaf do not even approximate to the nursery method of the hearing child. Not one of the little hearing children whom you may have left at home commenced by learning elementary sounds. Mothers do not begin with elementary sounds and then combine them into syllables and words. The mother speaks whole sentences even to the infant in arms. The child listens and listens, until a model is established in the mind. Then the child commences to imitate, not elementary sounds, but whole words. Indeed, people grow up to adult life without ever having uttered elementary sounds, and when they do come to study them, it is for the purpose of improving and perfecting their speech. With hearing persons the elements come last, not first. They constitute the final, not the initial, exercises of articulation. I would commend this fact to the serious attention of the members of this Association. The question is often in my mind whether we are not making a radical mistake, and whether it would not be better to commence with sentences and whole words, rather than with elements, and accept imperfect speech from little deaf children as we do from hearing children.

If you copy the natural process, what you want first is the *use* of speech, and then perfect the articulation as the child grows up. In this connection I would commend to your notice the paper of Dr. Greenberger upon the Word Method, which constitutes our first Circular of Information. This is an entire reversal of the position I assumed when I entered upon the work of articulation teaching. But the more I think of it, the more I am convinced that a great principle is involved. Words first and elements afterwards. I recognize, however, that there are real practical difficulties in the way of its application to the deaf. If you once allow a deaf child to speak in a defective manner is there not danger that the defective pronunciation will become habitual? This is a serious objection and should be carefully considered. In the case of the hearing child, a corrective element is always present, he hears. He hears the model pronunciation constantly used by those about him, and also hears his own imperfect babble. His ear forms a medium of comparison whereby he perceives the relation of the sounds he utters to those he desires to make. In the case of the deaf child we might anticipate that a corrective element would also be present if he could see speech as others hear it.

(1) He must see the model pronunciation constantly and clearly repeated so as to fix it in his mind, to take the place of the conversation that goes on in the presence of the hearing child; and

(2) He must see his own imperfect speech so that he may perceive the relation of the sounds he utters to the correct pronunciation.

It may be well to consider how far it may be possible for us to bring about these conditions.

1. Speech reading fulfills the first condition only in part. The visible movements of the mouth may recall the model pronunciation to the mind of the deaf child, when once acquired, but it does not exhibit the pronunciation with clearness and definiteness to the eye. If we could supplement speech-reading by books and periodicals printed in phonetical type, a great advantage would be gained. In Germany and Italy, where oral methods are most successful, spelling corresponds to pronunciation, and this first condition is, therefore, fulfilled by the ordinary literature of those countries. In English-speaking countries, however, ordinary literature is of comparatively little use in impressing upon the memory of the deaf child the correct pronunciation of the language. Our spelling is so irregular and unphonetical that even hearing people often have to

esort to a dictionary to ascertain how a word should be pronounced. What we most need is reading matter for our pupils in which the words are spelt as they are pronounced. In two hours a deaf child can read as many words as a hearing child hears in the course of a day, and if the spelling only corresponded to the pronunciation, reading would fix the model in his mind, and speech-reading would constantly recall it. Any kind of phonetical alphabet would do for this purpose; but Visible Speech would be especially advantageous because it would be possible through this agency to fulfil the second condition also.

2. The deaf child must see the relation between the sound he utters and the correct sounds of speech. I know of no other means of accomplishing this end than Visible Speech or the Lyon Manual,—but they will do it.

I think with these agencies we would have a corrective element that would lead to improvement of speech as the child grows up and permit of the adoption of a more natural method of teaching than now exists.

I throw out these thoughts as suggestions merely, for I recognize, of course, the great difficulty of carrying them practically into execution. I would have you, however, appreciate the importance of the principle involved, and consider whether in the face of the difficulties that present themselves, it would be better to abandon the principle, or study the difficulties and attempt to remove them. I think that that method which conforms most nearly to the method whereby hearing children acquire speech, will be most worthy of adoption by teachers of the deaf. With these remarks I shall close. I shall now be glad to answer any questions.

MR. LYON: I would like to know if the symbols on your charts represent the elements to which you would reduce all the English words?

DR. BELL: Yes. There are some elements not usually considered as English. The German *ch* (C) for instance, and its corresponding vocal (Є). I would recommend that those should be taught to every deaf child, because they enter into the composition of Ↄ (*wh*) and ɨ (*oo*) and, indeed, form the key to the English vowels.

MR. LYON: I notice that the glide *r* is omitted.

DR. BELL: Yes. And I consider that as a very important matter. I have found it a very difficult thing to get glide *r* from a deaf child without gross exaggeration of the movement of the

tongue, and I consider it entirely unnecessary to bother him about it. I would recommend substituting for glide *r* a mere indefinite murmur of the voice (ı). If you give that to a deaf child in place of glide *r* you will get something which passes current for good speech, although there is no suspicion of an *r* about it.

MR. LYON: I see in the symbols that the indefinite position represents voice glide. Is it the same thing?

Dr. BELL: The same thing. What I mean to say is, that when we give a deaf child the indefinite voice mark in place of glide *r*, we obtain from him a sound that approximates very closely to the vernacular effect.

MISS YALE: I believe in DR. Bell's theory thoroughly.

THE PRESIDENT: The time has now come for our closing exercises, and I am sorry, extremely sorry, as you all must be, that it has become the duty of the Board of Directors to appoint a Committee on Necrology. I will ask Miss Fuller, as chairman of the Committee on Necrology, to make a few remarks.

MISS FULLER: This announcement seems almost like a note of warning to us, coming as it does before our Association has been in existence a year. We have lost one who has been earnest and helpful in the work, not only in his own State, but in his efforts generally on behalf of oral schools for the deaf. Mr. Hubbard will pay our tribute of respect to the memory of the Hon. Henry Lippitt.

MR. HUBBARD: I have prepared a set of resolutions which I will read:

"*Resolved*, That we deeply regret and mourn the death of Henry Lippitt, some time Governor of Rhode Island, one of the foremost manufacturers and leading men of that State, and especially venerated by us as father of Miss Jeanie Lippitt; one of the founders and supporters of the Schools for the Deaf in Providence.

"*Resolved*, That a copy of this resolution be sent to Mrs. Lippitt and others of the family of the deceased."

Mr. President, it is one of the noted facts in connection with the education of the deaf that in so many instances it has been through the sympathy of a friend or father of a deaf child, that institutions for their relief have been formed. It was so in France, where the Abbe de L'Epee was interested in one single child, which led to the relief of many. It was so in England, where the father of a child led Mr. Braidwood to take so great an interest in establishing schools for the deaf. It was so in America, where Mr. Gallaudet was led by his interest in a little child to establish the American Asylum, the father and the mother of all schools for the deaf in

this our beloved land. Mr. Lippitt was one of the foremost business men of Rhode Island, one of its largest manufacturers, the founder and president of the Board of Trade. He was known and honored throughout his State. Mrs. Lippitt, when he first knew her, was one of the leaders of fashion in that city, interested in everything that was going on. Her interest in society did not prevent her watching over the education of her child until she became the best lip reader I have ever met with. As the child grew older and entered into society, the interest of the father and mother broadened and widened, and they took a deep interest in the Clarke Institution; and later in founding and supporting a school for the deaf in the city of Providence. It is therefore with great pleasure that I present these resolutions.

MR. WESTERVELT: The Secretary will present a report of the action of the Board of Directors on several matters of importance. Miss True has been appointed the representative of the Board of Directors to visit schools for the deaf. In consideration of her appointment to this position, she has tendered her resignation as a director to the Association. Her resignation was refused: but she again presented it and under the circumstances of her feeling it was necessary she should resign, being a salaried officer of the Board, her resignation was accepted; and Mr. Fechheimer of Cincinnati is elected to the Board of Directors in her place.

The Rev. Dr. John Hemphill, Professor Samuel Porter and the Rev. Mr. Baldwin are elected honorary members.

The Secretary has during the past few months incurred considerable expense for stationery; he has sent out about two thousand envelopes and a large number of circulars, and has had considerable printing done; but due to the liberality of the President this will be of no expense to the Association.

The Treasurer presents a report, which is as follows:

CHARLES J. BELL, TREASURER, IN ACCOUNT WITH THE AMERICAN ASSOCIATION TO PROMOTE THE TEACHING OF SPEECH TO THE DEAF.

1891	DR.	
June 30.	To Amount received from 179 members for annual dues 1891-92	$358.00
	To Amount received from Life Members	200.00
	" " " " Interest on Investments	232.66
		$790.66
1891	CR.	
June 30.	By Balance in Bank of Bell & Co., Washington, D.C.	$790.66

CHARLES J. BELL, TREASURER IN ACCOUNT WITH BELL VOLTA BUREAU FUND.

1891	DR.		
April 25.	To Amount received from A. Graham Bell.....		$25,000.00
1892	CR.		
April 25.	By Note Allen C. Clark, dated March 19, 1891, 3 yrs. 6% interest secured by Deed of Trust on Real Estate.....	$7,500.00	
	By Notes H. G Lewis, dated March 1, 1889. 5 yrs. 6% interest, secured by Deed of Trust on Real Estate.....	6,520.58	
	By Note G. G. Hubbard, dated Oct. 5, 1890, on demand 6% interest, secured by collateral.....	7,000.	
	By $3,900 Am. Security and Trust Co., 5% Debenture Bonds, at par and accrued interest.....	3,914.07	
	By Balance in Bank of Bell & Co., Washington, D.C.	65.35	
			$25,000.00

Besides the regular members who pay $2.00 a year, and the life members who are elected by their own act to that position by payment of $50.00, we have also honorary members, and at this meeting Mr. Fechheimer has established another membership of subscribing members. Mr. Fechheimer has subscribed $100 annually for the support of the Association. It is not necessary for the Association to take any special action upon this to constitute subscribing members. It is hoped that a great number will become subscribing members, for any amount from fifty cents upwards; as the Association needs funds and we have undertaken a good deal of work.

A number of letters have been received expressing regret at the inability of the writers to attend the summer meetings. These letters will be published in the minutes of the proceedings.

Miss Way's paper on the Whipple method will be amplified, and published by the Association as a Circular of Information.

Mr. Hitz has had here for distribution a number of publications in the interest of the deaf, issued by the Volta Bureau. Some have understood that this Bureau is connected with the Association. It is an independent society entirely, but it gives these publications to the members of this Association and to everyone interested in the education of the deaf. Our list of members comprises a little over three hundred names.

PROF. GORDON: Mr. President:—Here as elsewhere we have a touch of sunshine, a touch of shadow. I rise to move the adoption of a resolution in regard to the late J. Scott Hutton.

I will not attempt to give a detailed account of his life and labors. It is known to many, if not all present that Mr. Hutton's

father was an able instructor of the deaf, and that the son followed in the father's footsteps, devoting his entire life to this great work. I wish to submit the following resolution.

I may say that I became acquainted with Mr. Hutton twenty-one years ago, the first time I met him being at the Indianapolis convention in 1870. Dr. Fay, Dr. Williams and Dr. Gillett met him at the same time and we have known him and honored him ever since.

"*Resolved*, that this Association desires to place upon record an expression of its appreciation of the late Principal of the Halifax Institution, Mr. J. Scott Hutton, whose character, attainments, labors and achievements, will long remain not only in the hearts and lives of those nearest to him, but also as a part of the heritage of many in the profession who knew him, and knowing him, honored and loved him ; and it is the pleasure of this Association that the Secretary transmit to Mrs. Hutton this expression of our heartfelt sympathy and tender regrets."

MISS YALE: I would be glad to second this resolution as a matter of personal regard for Dr. Hutton.

THE PPESIDENT: I will say also that I have been thrown a great deal in contact with the late Mr. Hutton, and feel personal sorrow and regret that we should lose so valuable a member of our profession, and so good a friend to the deaf.

MR. THOMPSON: There have been, as you know, three representatives of the Lexington Avenue School present; but in the absence of our Principal we have not been willing to take up the time of the Association to give any account of the methods pursued in our school. The work of the Association here has been a surprise to me and I greatly regret Dr. Greenberger's absence. The little pamphlet of his which has been published as a circular of information, contains all he would have said and perhaps more. I can heartily recommend the reading of that to every member of the Association; and those who have not yet received copies can obtain them from the Committee on Information.

In regard to the Meeting of the Association I can but say that for my own part I have received great benefit here, and I would like to offer the following resolution:

"*Resolved* That the thanks of this Association are due to its President, Vice-Presidents, and other officers for their unwearied efforts in arranging for this first summer meeting, which has been of such great interest and so useful to all members of the Association."

The resolution passed unanimously.

MISS FULLER: I would like to offer the following resolution:

"*Resolved*, That the thanks of the members of the American Association to Promote the Teaching of Speech to the Deaf, are due and are hereby tendered to Prof. Z. F. Westervelt, our Secretary, for the energy and ability with which he has performed the laborious duties of his office, both before and during our present Meeting."

MR. HUBBARD: I do not believe that the members of the Association can be aware how much we are indebted to our Secretary for his constant and unwearied efforts in their behalf. This meeting would not have been the success it is if we had not had Mr. Westervelt as our Secretary.

THE PRESIDENT: In putting this resolution to a vote I bear evidence to the faithful work of our Secretary. I have been during all the period of the genesis of this meeting in constant contact and association with Mr. Westervelt, and no one who has not had that personal contact with him can for a moment realize the amount of hard work that has been done by Mr. Westervelt in connection with this summer meeting; all done as a labor of love. I have great pleasure in putting the resolution to the meeting.

The resolution was passed unanimously.

MR. CALDWELL: There is a power in the land which is at once our hope and our despair. We have frequent occasion to rejoice in its approval, and anon we deplore its inaccuracies, its misapprehensions of our aims and its irregular nomenclature of the technical features of our work. In view of these facts and in view of the very able manner in which this power has been represented during the ten days that we have been in session, therefore be it

Resolved, That the thanks of this Association be and are hereby tendered to the Troy Press for the very full and accurate account of the proceedings, and that we recognize the fact that the excellence of these reports is due to the presence and personal attendance at our meetings of the Associated Press Reporter, Mr. Nelson.

Mr. Caldwell's resolution was passed unanimously.

MR. BOOTH: I beg to offer the following resolution:

Resolved, That we render our sincere thanks to Miss Caroline A. Yale for the efficient and instructive manner in which she has conducted the practice school during this, the first Summer Meeting of our Association.

I will say for myself, and I think I speak the sentiment of the Association, that I have received very great profit from the practice school; and it seems to me that it establishes a precedent right in the beginning that should be followed at every meeting of the Association; that the sessions of the Association should be a school which teachers may attend and where they may receive instruction by practical class work.

THE PRESIDENT: I must say that for myself I feel that the success of this meeting has been very largely due to the practice school, and I join most heartily in voting upon this measure.

The resolution to Miss Yale was then passed unanimously.

PROF. GORDON: Mr. President:—I have been charged with an exceedingly pleasant duty. Others have done well, but there is one who has excelled them all. Others have had difficult tasks, but there is one who under all the circumstances has had the most difficult task of all; and I think that our appreciation should be expressed for the manner in which these duties have been performed. I do this with all the more pleasure from the fact that while I agree with the gentleman in many things which I think are most important for those whom we are desirous of serving, still it is well known that we differ in regard to some very important particulars. I now move the adoption of this resolution of thanks to our President:

Resolved, That our thanks are hereby tendered to Dr. Alexander Graham Bell for the able, courteous, impartial and dignified manner in which he has presided over this meeting of the Association.

MR. WESTERVELT: You have all heard the resolution, and it is seconded by the entire Association; those who wish still further to indicate their approval will please say aye.

Passed unanimously.

THE PRESIDENT: I thank the Association for the courteous way in which they have received their President.

DR. WILLIAMS: I want to say a word before we leave this place. I must confess that when I left home that it was with a little feeling of doubt as to the amount of profit and pleasure I was to derive from this trip here and from the meeting of this Association, but I had not been here long before there was no more doubt in my mind on that subject. I should have been very sorry if I had missed this meeting, and I am very sorry that more of our Hartford teachers have not been here to receive the benefit that those of us who have been here have received. I am sure that no teacher of speech could come here and sit through the meetings of this Association and listen to the lectures which we have had here upon the vocal organs and the voice, and listen to the expositions of the different methods of teaching, the difficulties that have been met with and the explanations of the way in which to overcome these difficulties; and not go away from this place better prepared to do their work as teachers of speech and speech reading,

I am sure that everyone who has been here must feel it has been good to be here and that we have received benefit from this meeting; and the association with these teachers has been very pleasant indeed. It has been pleasant to renew old acquaintances and to make new ones; and I think we shall all go away from this place with very pleasant memories of the hours we have spent here together. There have been cloud and wind and wave outside, but beneath this roof all has been sunshine, calm, plain sailing; and I am very glad to bear my testimony to the good which I believe has been accomplished by the meeting we have had here.

MR. BOOTH: I have another resolution which has been handed me by Miss McDowell, which I now offer:

Resolved, That the thanks of the members of the Association are tendered to the Delaware and Hudson Railroad Company for reduced rates of fare to members of the Association on their lines.

Passed unanimously.

Mr. CROUTER: I hold in my hand a resolution which some kind friend placed there; and I am not sure whether it has originated with him or not. I don't think while we are offering these resolutions we should fail to include those who have contributed to our physical welfare and comfort while here. I will offer the following resolution.

Resolved, That the thanks of the Association are tendered Mr. F. G. Crosby, Mr. R. C. Jenkins, and other proprietors of the Crosby Hotel for their hospitality during the session of the Association, and for the use of their parlors.

Passed unanimously.

MR. CROUTER: I have been asked by Mr. Theodore A. Kiesel, from Kendall Green, Washington, to read a few remarks prepared by him. It gives me great pleasure to do so.

"MR. PRESIDENT, LADIES, GENTLEMEN, FRIENDS:—

It is a privilege to be here. It is an honor to be a member of the American Association. It gives one encouragement to look his brother in the face and see therein an echo of the sentiments which fill his own breast.

"Improvements on our systems of instruction are marching with rapid strides. Some years ago it was only a few that had the opportunity of learning to talk. To-day the privilege is open to all who have the natural ability.

"The ability to speak distinctly is a gift that few possess. It brings joy into the heart of a deaf person to be able to talk even a little.

"To face a hard and practical world the deaf must have a good command of language first of all; otherwise all lessons in articulation will avail them nothing.

"At the Kendall School in Washington, speech is taught to the deaf profitably. We are doing all in our power to encourage our pupils to use their voices. We think we have one of the best teachers of articulation in the country. No doubt her name is familiar to you all—Miss Gordon.

"Being a teacher myself, I appreciate what you are doing. It is sometimes trying on the patience of the teacher. I know how vexatious it is when the young idea refuses to shoot. It is noble work to engage in. Be of good cheer. Bright days are before you. The time is not far distant when there will be a universal system, by means of which the deaf will acquire a knowledge of language much more quickly and easily than now. I bid you God speed."

MR. WESTERVELT: I would suggest Mr. President that it would be proper for us to express our appreciation of the labor Mr. Crouter has performed as Temporary Treasurer of the Association, and I will offer the following resolution:

"*Resolved*, That the thanks of this Association are due to Mr. Crouter for the satisfactory and agreeable way in which he has performed the rather disagreeable service of settling the accounts of the members with the Crosbyside Hotel."

Passed unanimously.

MR. KIRKHUFF: I came to Crosbyside more in expectation of the pleasure I should receive from social intercourse with the members of our Summer Meeting than of deriving help for my work in the Manual Department of the Pennsylvania Institution for the deaf, in which I am a teacher. I thought our methods so different that I could learn but little from oral schools that would be of use to me. But I had not been here long before I became deeply interested in the proceedings of our daily meetings. I was constantly learning much that I could use in my classroom, besides what was being done to give speech to the deaf. There is much, I find, in our work that is the same, no matter what method we pursue.

So instead of wandering, as I expected about the borders of Lake George and over its mountain sides, I have been a constant attendant at these meetings. I felt that I could not be absent without losing much that would be of value to me in the education of the deaf. There are none who realize more deeply how difficult this work is than those who have been long in it, and how much there is to learn. After more than a quarter of a century I find myself still a learner.

The condition of the deaf in all circumstances is a sad one, and everything that intelligence and scientific skill can do to ameliorate their unhappy lot should be done in their behalf. Christian charity and philanthropy demand this of us. No matter how well the deaf be made to speak or how intelligent they become under our instruction, they still need our sympathy. Speech and intelligence only make them feel more keenly the loss of the sense of hearing.

I take the warmest interest in oral schools and oral work, and I shall continue to do, as I have in the past, all that I can to promote the teaching of speech to the deaf. I may not myself be active in the work of oral schools, but that is no reason why I should not help to advance the cause for which this meeting was called. There are, in my opinion, many of the deaf who can be more successfully taught in Manual Schools. There should be no contention about our methods so long as it is the one best suited to the pupils under it, preference being given to the oral. Kindly feeling and sympathy should prevail among us as long as we are sincere and earnest in our efforts for the improvement of the deaf in whatever way may be best suited to their moral and intellectual well-being.

DR. G. O. FAY: Mr. President, your invitation to say a few words at this closing hour has touched my heart, for I feel that in speaking I speak for a generation. September next will begin my thirtieth year of uninterrupted service in the education and care of the deaf. Dr. Gillett has referred to the first conference of principles held in Washington. Dr. Gillett and myself are the only representatives here of those who were present on that occasion. I remember well the exciting, critical, skeptical discussion that was held upon the possibilities of speech and lip-reading; and I also remember certain resolutions adopted that there should be efforts made, experimentally at least, to teach speech in all our institutions.

I returned to Ohio resolved to provide for the teaching of speech; and this department has grown in the Ohio Institution from the teaching of ten per cent of the pupils, as then, to the teaching now, as my daughter reported to us yesterday, of thirty-five per cent. was, forsooth, an experiment we were to try. What is the opinion of those principals now? What is my opinion? Dr. Gillett has brought his daughter here, and I have brought my own two daughters here, as members; nor should I omit to mention another member present, a granddaughter of Rev. Collins Stone,

remembered as an active member of that Conference, and representing in it the American Asylum. These daughters are now teachers, all of them, in the Oral Departments of their respective Institutions. And yet it should be said that they have not selected the teaching of articulation upon parental urging, but as a labor of personal love and choice, with a full conviction of its usefulness and importance.

It was twenty-three years ago that Dr. Gillett and myself entered upon the experiment. Can you doubt or fail to perceive what we think now?

Another reminiscence has come to mind as I have sat here. The first convention of teachers, held in New York in 1850, consisted wholly of men. I have attended nearly all the conventions and some of the conferences of principles since that time; but what changes the membership has undergone. I remember at Washington a paper written by Miss Cornelia Trask, of Illinois, and read by Dr. Gillett, urging the members of the conference to consent to employ lady teachers in their schools.

The first official act of my superintendency in Ohio in 1866, I am not ashamed to say, was to select a lady teacher. Did I live to regret it? I repeated that act, until at my leaving in 1880, two-thirds of the teachers in that institution, seventeen out of twenty-six, were ladies. We needed the patience, the love, the delicacy, the perfect manipulation and the conscientious fidelity of women, to complete and to perfect our organizations.

In one of those early years, soon after the war, a stranger came into our kitchen in Ohio, desiring a meal. His attention was arrested by deaf-mutes all around him, using signs about their work. As soon as he caught on to the situation, he asked excitedly: "is this anything catching?" and darted out of the house. The sight of sign-making did not affect me that way. I loved the children, sign-makers and all; I continue to love them; and all of you love them I am sure; and we have been laboring years and years to improve their condition. Some of them have used signs, are using them to-day, and have not suffered from their contagion; by no means have we. Most of us have used the manual alphabet, and are using it to-day with eminent profit; and I think I may say all of us have tried and are trying with various thoroughness to add to what has been at any time done in the teaching of speech and lip-reading, so that the education of the deaf may include, when completed, oral

speech, as its finest element, its finishing one, however artificial any may consider it, as I certainly do.

I am frank to say, and wish to say, that in the past there have been serious errors in proportion. I am sure that sufficient attention has not been given heretofore to the teaching of speech, and I believe that all teachers are glad that more and more attention is being given to it these later years.

In this connection my thoughts recall another curious incident. I remember well a church whose location I will not name. It was a stately, time-honored, orthodox, influential church, and the edifice itself had all the characteristics of its members. The front seats were occupied by the solid people of the town. They owned their pews, and for a generation had sat or slept and heard the Gospel; but there came a time when the high-perched pulpit must be lowered and modernized. Some of the pew-owners, affected by the change proposed, would not consent to any such disturbance, desecration they called it, and lay back stubbornly upon their property and personal rights. The agitators persisted in their efforts to modernize the pulpit as a means of grace, but could not persuade those in possession to modify their ideas the breadth of a hair. The agitators, cranks some called them, were really a majority in numbers, though not in wealth, and as a last resort secured a vote of the society to remove the pulpit to the other end of the church where it is to-day. The sleepers had their choice either to right-about-face. remaining thereafter in the rear, or to sleep on forever.

I trust I do not belong to that class of conservatives. I hope none of us do. I am ready to recognize all that is really valuable, and to keep up with the procession in all that is rationally progressive in all that effects the welfare of the deaf, even though it has not originated with myself; and I love to believe that all teachers of the deaf have the same generous purpose.

I have enjoyed the meeting of our Association intensely; and I wish to say that the repeated appearance of lecturers has not been wearisome in any degree. Their lectures have grown in interest to the very end. I do not remember a convention or a conference where the proceedings were handled as efficiently and perfectly as they have been here. I do not remember one where we have been so carefully, so patiently, and so intelligently instructed. We have been made up of learners and teachers, eminently competent. We have all wished to learn, and we have not wasted time upon trivial questions, upon considerations of leadership, wrangling or display.

Everyone has desired to carry away all that this Association could impart. It has been a short session really, although extending through ten days. The conferences and conventions have usually occupied three or four days, or five at the most. We have had ten full days undisturbed by restless feelings or haste to get away.

This Association has set, in some respects, an example to our conventions and conferences, an example which I hope they will imitate, notable in taking quarters at a hotel, each member cheerfully paying his personal bill. I do not remember a convention or conference where the entertainments available or provided, and the accessories of scenery and society gave greater pleasure. Of course the California Convention had that magnificent, unequalled trip across the continent coming and going, and upon our arrival at Berkeley, we were royally entertained. But I am sure these comforts after arrival did not surpass what we have experienced here.

There never was an excursion at any conference or convention where the elements of scenic beauty and social pleasure were so happily combined as they were upon our Fourth of July excursion down Lake George.

I feel that the work of this Association has been done well, far better than most of us expected. No higher wish for its prosperity in the future can be cherished than that the emulation of others may make it possible to say that we or they will try to do better.

THE PRESIDENT: We have listened to the words of one of the veterans in our work; and now I am sure we will be glad to have a few words from the youngest member of this Association. Mr. Abraham Fechheimer would like to make a few remarks.

MASTER ABRAHAM FECHHEIMER: Mr. President, ladies and gentlemen: The other day I learned that I had become a member of the Association and I am very proud that I belong to an Association that has done so much good for the deaf. I will try and do my best so none of you will be ashamed of having made me a member. I have graduated from Clarke Institute and I will never forget the six years which I spent with Miss Yale and her teachers who did so much to make me happy. I hope this good work will progress, and that the result will be seen all over the country before long.

THE PRESIDENT: The time has come when this pleasant and profitable gathering must separate, and the members go to the places from whence they came. I am sure I express the sentiment of all who are here, that this has been a great meeting; that we

have at this meeting sown a seed, the results of which no one can foresee.

Only a few years ago, and there was not one articulation teacher employed in this country; to-day forty-one per cent of our pupils are taught to speak. What will be the influence of this meeting upon that percentage? I trust that many of us may meet together again next year. I feel sure that the statistics of articulation teaching in America will show an increase in the numbers taught articulation; and that that increase will be due to this meeting here. With these words I will bid you adieu and call upon the Rev. Dr. Hemphill to close the proceedings with prayer.

REV. DR. HRMPHILL: If I am not the youngest member of the American Association to Promote the Teaching of Speech to the Deaf, I am very nearly so, and I cannot permit this convention to adjourn without a parting word. I just received official notice this morning that I had been honored by being elected a member of this Association, and I use no mere form of words when I say that I deem it a high honor, and I shall be very glad to hear of the increasing success of this Association in the years to come.

Before I came here I had heard something about an association whose object was to promote the teaching of speech to the deaf, but I was skeptical about it. Now I am like Thomas when he saw his risen Lord. I am no longer a doubter; I am convinced it can be done. A Scotchman (I believe you have the honor of being one), the inventor of the locomotive, was called upon to explain before a committee of stolid British lords, what was the nature of his invention. They asked what he proposed to do. Did he propose to run this locomotive around upon rails at the rate of twenty or thirty miles an hour? He said "yes." An unusually stolid British lord scratched his head and said: "Suppose a cow should come in contact with this thing you call a locomotive, what would happen?" The Scotchman said naively: "It would be a very bad thing for the coo."

Now I beg to say to those who are skeptical with regard to possibility of teaching the deaf to speak, that it would be a very bad thing for them if they come in contact with this Association in the sense of conflict. The thing can be done; has been done; is being done; and that reminds me of an anecdote I heard from an old and respected friend, Governor Pollock, of Pennsylvania, well known to many of you, no doubt. He was an elder of my church, a member of Congress at the time Mr. Morse discovered the princi-

ple of the electric telegraph. You see my thoughts are going out in the line of discoveries and inventions to-day. Governor Pollock believed that the electric telegraph could be made a success, but most of the members of Congress were skeptical about it. The Governor advocated, as a member of Congress, that the government make an appropriation to help Mr. Morse go on with his discovery. The appropriation was made and a line was laid from Baltimore to Washington. The members of Congress and many others were assembled at the hour when the first message was to be transmitted from Baltimore to Washington; I think the wire was from Baltimore to the White House. There were over a hundred members of Congress assembled around that little clicking instrument. It began to click, and this was the message the operator received from Baltimore: "What hath God wrought?"

As I listened day by day to these deaf-mutes speaking, and speaking through your instrumentality, God having taken you as his instruments to loosen their tied tongues, I can but exclaim: "What hath God wrought!" May God bless you in your noble work.

DR. G. O. FAY: Mr. President, allow me, before the closing prayer is offered, to put upon record, as a definite purpose, what I believe is in the mind of every member of this Association, that a reasonable proficiency in speech and lip-reading should be made an important condition of the fullest graduation in our state institutions, and an essential one in the National College, made up, as it is entirely, of selected students, and that if additional time and facilities are needed therefor, they should be solicited and insisted upon.

The Rev. Dr. Hemphill then offered prayer.

THE PRESIDENT: I declare the First Summer Meeting of "The American Association to Promote the Teaching of Speech to the Deaf" at an end. The meeting is now adjourned *sine die*.

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OF THE

AMERICAN ASSOCIATION TO PROMOTE THE TEACHING OF SPEECH TO THE DEAF.

JULY 10, 1891.

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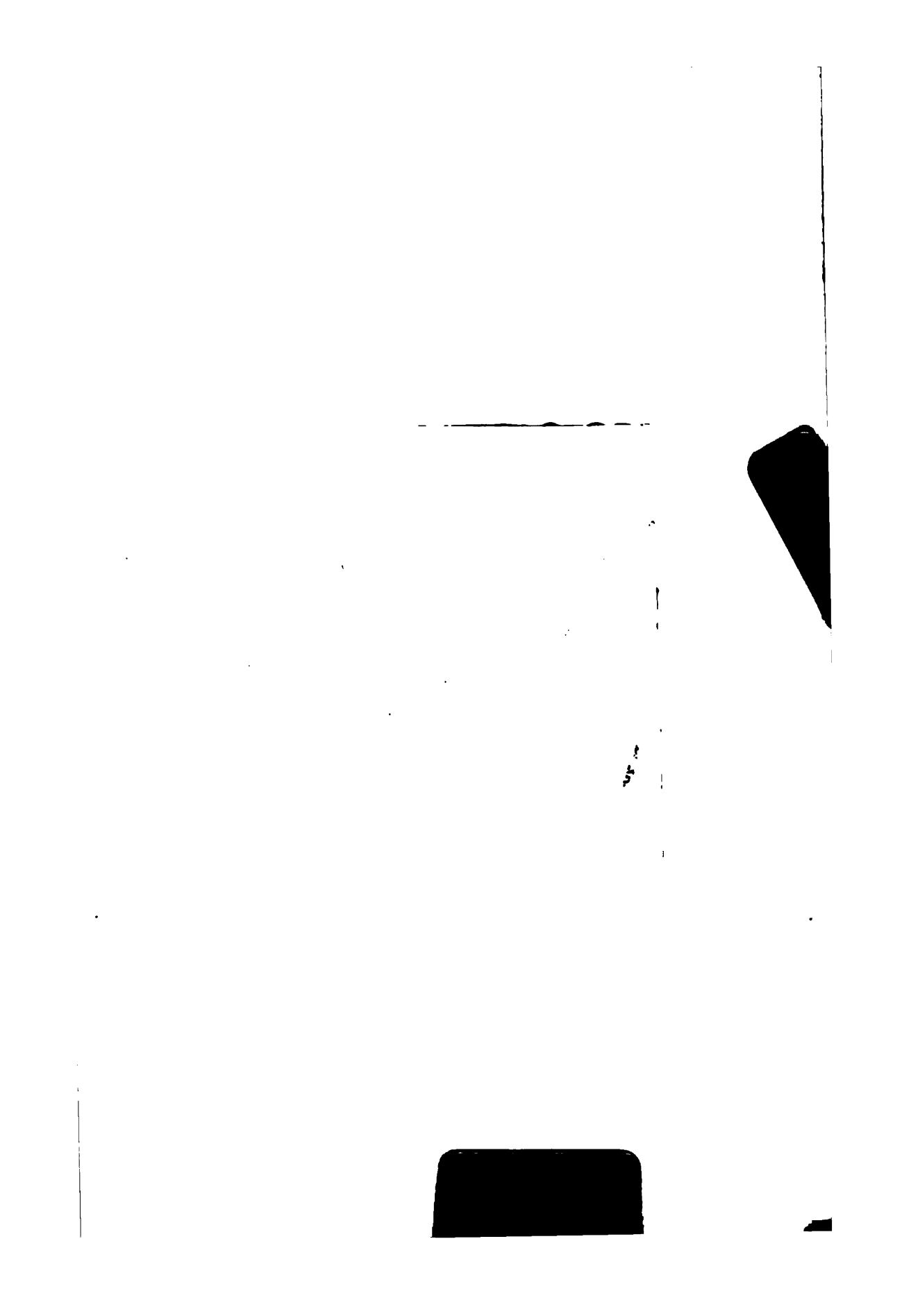
ERRATA.

On page 7, Programme for Thursday, change "The Whipple Phonetic Manual" to read "The Whipple Natural Alphabet."

On pages 66 and 198 after the titles read "by Dr. A. Graham Bell."

On page 87 after title read "by Hon. Gardiner G. Hubbard."

On page 156 change title to read "Discussion Upon the Lyon Phonetic Manual."

On page 331 change title to read "The Whipple Natural Alphabet."